People's Democratic Republic of Algeria

Ministry of Higher Education and Scientific Research
Kasdi Merbah Ouargla University

Faculty of Letters and Languages

Department of Letters and English Language

Dissertation submitted in partial fulfilment of the requirement for the Master's Degree in field of
English Language and Literature

Specialty: Linguistics

A Study on Algerian EFL University Teachers' and Learners' Awareness, Use, and Perceptions of Large Language Models in Developing the Writing Skill

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2023/2024

Dedication

I humbly dedicate this dissertation to the Almighty, thanking Him for His guidance and blessings throughout this journey. I offer this tribute in loving memory of my father, Belkacem, whose spirit of perseverance and dedication lives on in my work.

To my ever-supportive mother, my cherished sisters, my esteemed brother, Adel, and my beloved nephews, your unwavering belief in me has been my strength.

A special dedication to my supervisor, Prof Touria Drid, whose profound guidance has been instrumental in shaping this academic endeavour.

I extend my deepest gratitude to all those who have shared their knowledge with me, be it a single letter or an insightful lesson. Your influence has been profound and life-changing.

This dissertation stands as a testament to our collective journey, a journey of learning, growth, and shared wisdom. Thank you for being a part of this remarkable odyssey.

<div align="center">Abdelhamid Djeghoubbi</div>

Praise be to God, and blessings be upon the Prophet Muhammad, his family, and his faithful companions. With this dissertation, we have successfully reached this milestone in our academic journey, thanks to the Almighty.

This achievement is a result of hard work and divine guidance, dedicated to our dear parents, may God protect them, to our noble family, and to my companions in this journey: Abdelhamid, Abdellatif, and Souhaib. Special thanks to our research supervisor, Prof Touria Drid.

<div align="center">Elfakeur Abidi Saad</div>

Acknowledgements

In the name of Allah, the Most Gracious, the Most Merciful.

We extend our heartfelt gratitude and humility to all who have supported and guided us throughout the dissertation's completion journey.

First and foremost, we express our sincerest gratitude to Allah for granting us the strength, perseverance, and wisdom to undertake this endeavour.

We are deeply thankful to our supervisor, Prof. Touria Drid, whose unwavering support, insightful feedback, and encouragement have been instrumental in shaping this dissertation. Her dedication to excellence and commitment to our academic growth have been truly inspiring.

We extend our heartfelt appreciation to the members of the jury for their time, expertise, and valuable feedback. Their insights have contributed significantly to the enhancement of this work.

We would like to acknowledge all the teachers in the English Department at Kasdi Merbah University who have played a pivotal role in shaping our academic journey over the past five years. Special thanks to Dr. Belarbi, Dr. Amina Khalfi, and Dr. Youcef Benchiek for their guidance and support.

We are grateful to the administration staff, especially Aulia, for their assistance and support throughout our studies.

Thank you all for your support, encouragement, and belief in us.

Abstract

This study explores the awareness, use, and perceptions of LLMs among Algerian EFL university teachers and learners, with a focus on their role in developing the writing skill. Given the importance of AI in language learning, this research addresses a research gap in understanding how such tools are integrated into Algerian EFL teaching and learning. With a sequential mixed-methods design, the research integrates quantitative data from 87 completed closed-ended questionnaires with qualitative insights from 9 student and 5 teacher semi-structured interviews. This approach enables a profound exploration of both statistical patterns and personal experiences regarding the use of LLMs in developing the writing skill. Findings indicate a high level of engagement with LLMs, with the majority of students and teachers recognising their potential to significantly enhance the writing skill. Evidently, students reported improvements in grammar and vocabulary, while teachers stressed the usefulness of LLMs in providing feedback and engaging learners. Nevertheless, issues such as dependency on technology and concerns about academic integrity were also mentioned. Although LLMs hold remarkable potential for altering EFL education by supporting writing skill development, there is an urgent need for guidelines on efficient use to achieve maximum benefits and mitigate hazards. Ultimately, this study recommends the creation of training programmes for teachers and the establishment of standards for integrating such tools into writing curricula.

Keywords: Large Language Models, Writing Skill Development, Kasdi Merbah University, Artificial Intelligence, English as a Foreign Language.

List of Abrreviations

AI: Artificial Intelligence

EFL: English as a foreign language

GPT: Generative pre-trained transformer

ICT: Information and Communication Technologies

KMUO: Kasdi Merbah University, Ouargla, Algeria

LLMs: Large language models

NLP: Natural language processing

TEFL: Teaching English as a foreign language

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General Introduction

Background of the Study

Teaching and learning English is vital in the modern world. According to Crystal (2012), English is spoken by nearly 1.5 billion individuals worldwide, or approximately 20% of the global population. This makes English a key language for communication, business, academia, and diplomacy. In the context of English as a foreign language (EFL), the writing skill is particularly important as it enables effective communication, fosters cognitive development, and is essential for academic and professional success (Krashen, 1982; Raimes, 1983; Hyland, 2013). Writing allows learners to develop grammar skills along with vocabulary (Krashen, 1982). It is a critical component of language proficiency, which allows individuals to express their thoughts, ideas, and arguments in a structured and coherent manner.

EFL learners and teachers often face numerous challenges in developing the writing skill. Major problems include a deficiency of vocabulary, an inadequate understanding of grammar, and a lack of the writing skill (Raimes, 1983). Other challenges include spelling mistakes, students' preparedness, and inadequate access to books and reading supplies (Hyland, 2013). These obstacles are caused by multiple variables, such as the materials, methods of instruction, and the learners themselves (Raimes, 1983). In light of these challenges, it is essential to employ appropriate and tailored teaching strategies, such as differentiated instruction, interactive and collaborative learning activities, and extensive reading programs, to effectively enhance learners' writing abilities and overcome these barriers (Brown & Hood, 1989).

Technology has been integrated into EFL education over the years, significantly impacting teaching and learning outcomes. For instance, technology can improve individual potential and protect human rights to promote successful collaboration between humans and machines in life, education, and work, and it can promote long-term growth (Sheehy & Holliman, 2017). When it comes to language pedagogy, it can promote EFL learners' listening and reading comprehension, enhance speaking development, reduce EFL anxiety, strengthen cultural competence, improve long-term retention, and increase learning enthusiasm, in addition to other benefits (Smith, 2015).

Artificial intelligence (AI) is a rapidly advancing field with potential applications in education, particularly in addressing some of the challenges in the writing skill development. AI tools, which encompass any software or system that uses AI to perform tasks, automate processes, analyse data, or provide decision-making support (Phillips-Wren, 2012), can assist EFL writing by identifying errors and/or offering feedback on grammar, spelling, structures, and use of words

(Liu *et al.*, 2023). Tools such as Grammarly, Jasper, Quillbot, Sudowrite, and Chibi have been utilized to improve students' academic writing and logical thinking (Aladini, 2023). Those tools allow learners to focus not just on the grammatical features of writing but also on the meaning and presentation of the language (Liu *et al.*, 2023).

Large language models (LLMs) are advanced computational algorithms that process, understand, and generate human-like text based on large datasets of existing texts (McGeorge, 2023). Research has shown that these models have become increasingly integral in the writing skill development, providing innovative ways for students to engage with and improve their writing skill. Generative Pre-trained Transformer (GPT)-3, for instance, has been utilized as an automatic text generator in foreign language classrooms, offering opportunities for interactive learning and practice (Alharbi, 2023). These models have shown promising results in enhancing the writing skill. Recently, at the end of 2022 and in 2023, the AI field witnessed the emergence of very sophisticated LLMs: GPT-3.5, GPT-4, and Google's Bard (McGeorge, 2023).

The current level of awareness and use of LLMs among EFL teachers and learners seems to be gradually increasing. According to Kim & Kim (2022), teachers have started to understand the capacity of AI to improve teaching and learning results. For instance, AI has been found to enhance students' motivation for learning English writing (Silitonga *et al.*, 2023). However, there are also concerns about the open nature of the choices made by the AI systems and the shift in the role of the instructors in the classroom (Kim & Kim, 2022).

Statement of the Problem

There is a growing interest in the potential benefits of AI in the writing skill development. A study by Jiang (2022) provided an overview of AI applications in the EFL context but did not specifically explore the level of awareness and use of these tools among EFL teachers and learners; it also did not cover the recent AI language models. Similarly, a study by Xiao and Zhi (2023) investigated students' experiences with ChatGPT and their perceptions of its role in language learning, but the focus was not specifically on the the writing skill development. Therefore, there is a clear research gap in understanding the awareness, use, and perceptions of LLMs in developing the writing skill among EFL teachers and learners. Additionally, the noticeable scarcity of research specifically addressing AI and language pedagogy in the Algerian context has raised concerns among scholars and educators. This gap presents an opportunity for pioneering research in this area.

This study aims to investigate the level of awareness, use, and perceptions of LLMs among Algerian EFL university teachers and learners and how these tools are being used in developing the writing skill.

Research Objectives:

1. To investigate the level of awareness of LLMs among Algerian EFL university teachers and learners in developing the writing skill.

2. To investigate the use of LLMs among Algerian EFL university teachers and learners in developing the writing skill.

3. To investigate the perceptions of Algerian EFL university teachers and learners regarding the effectiveness of LLMs in developing the writing skill.

Research Questions:

1. What is the level of awareness of LLMs among Algerian EFL university teachers and learners in developing the writing skill?

2. How are LLMs being used by Algerian EFL university teachers and learners in the process of developing the writing skill?

3. What are the perceptions of Algerian EFL university teachers and learners regarding the effectiveness of LLMs in developing the writing skill?

Significance of the Study

The study holds significant value as it explores the under-researched area of LLMs' use in the writing skill development in the Algerian context. It provides insights into the awareness, use, and perceptions of Algerian EFL university teachers and learners of these advanced models. The findings could guide the integration of AI in EFL instruction, potentially enhancing writing proficiency and overall language competence. Moreover, it could inform the design of future LLMs, thus making them more effective and user-friendly for EFL contexts.

Research Design and Methods

Research Methodology:

The research paradigm of pragmatism, which prioritises practicality and problem-solving (Tashakkori *et al.*, 2003), will be well-suited for this study on LLMs and the writing skill. According to Creswell and Creswell (2017), this paradigm encourages a focus on practical outcomes, ensuring that the research findings will have direct applicability and relevance in various settings. Complemen-

ting this paradigm, the adoption of a sequential mixed-methods approach where combining both qualitative and quantitative approaches in stages is highly advantageous. This approach will allow for a multi-faceted exploration of the complexities involved. The chosen methodology for this study is the survey, which, according to Fink (2019), involves the systematic collection of data from a defined population using questionnaires and interviews.

Data Collection:

The data collection methods for this study encompass both closed-ended questionnaires and semi-structured interviews. On the one hand, closed-ended questionnaires provide a systematic means of gathering quantitative data that allows for the measurement of specific variables related to LLMs and the writing skill. Creswell and Creswell (2017) emphasise that this method enables efficient data collection from a larger sample, thus enhancing the generalisability of findings. On the other hand, semi-structured interviews facilitate the collection of qualitative insights by allowing participants to share their experiences and perspectives in their own words.

Data Analysis:

The data analysis for this study will involve a two-pronged procedure. For the quantitative data gathered through closed-ended questionnaires, descriptive statistics will be employed to examine patterns, frequencies, and correlations among variables. Qualitative data obtained from semi-structured interviews will be subjected to thematic analysis, which allows for the identification of recurring themes and patterns in participants' narratives.

Participants:

The participants in this study will consist of Algerian students pursuing English language and literature programme at Kasdi Merbah University, Ouargla, Algeria (KMUO), along with English teachers of written comprehension and expression module within Algerian universities. The sampling approach will combine convenience and snowball sampling for the questionnaire phase, allowing the selection of participants based on accessibility and referrals from initial contacts (Lavrakas, 2008). Subsequently, for the interview phase, purposive sampling will be employed, focusing on individuals chosen based on whether they use LLMs in teaching the writing skill or not.

CHAPTER-I. The Writing Skill

Introduction

This chapter critically examines writing as a multifaceted skill, intertwining cognitive, linguistic, and social dimensions. It dissects writing beyond its superficial role as transcription, considering its pivotal function in academic, professional, and personal spheres. This exploration emphasises the fundamental components of proficient writing, including grammar, syntax, and coherence. Additionally, it scrutinises the stages of the writing process and underscores their collective contribution to effective communication. The chapter aims to furnish an academic perspective on writing, thus recognising it as a dynamic, strategic skill imperative in diverse contexts.

I.1. The Writing Skill

I.1.1. Definitions and Scope

The writing skill is a complex ability to express thoughts, ideas, and information in writing (Flower & Hayes, 1980). Flowers and Hayes suggest that it involves cognitive processes like creating, organising, and effectively communicating written content. Langer (2001) sees the writing skill as a blend of linguistic, cognitive, and social processes that help individuals create coherent and meaningful texts in different situations. Graham and Harris (2000) define the writing skill as including both transcription skills (like handwriting and spelling) and composition skills (like planning and revising) that are necessary for producing good written texts. The writing skill goes beyond just transcription or grammar. It is a dynamic process that requires understanding the audience, purpose, genre norms, and rhetorical tactics (McCutchen, 1996). McCutchen emphasises the interactive and strategic aspects of writing ability.

I.1.2. Importance of Writing

Bereiter (1987) points out that the writing skill is important not just for communication but also for building knowledge. They consider writing a way to refine thoughts and deepen understanding.

I.1.2.1. Academic Writing

Academic writing is integral to the dissemination of knowledge and plays a crucial role in the educational process. Birkenstein and Graff (2018) emphasise that academic writing fosters critical thinking and argumentation skills, essential for scholarly discourse. According to Hyland (2016), it serves as a medium for students and scholars to convey research findings, engage with existing literature, and contribute to ongoing academic conversations. The structured nature of academic writing, often adhering to specific formatting and stylistic conventions,

prepares students for scholarly communication and professional discourse (Swales & Feak, 2004).

I.1.2.2. Professional Writing

In the professional realm, the writing skill is pivotal for effective communication and career advancement. According to Kolin (2009), professional writing, which includes reports, emails, proposals, and other business documents, is crucial for operational efficiency and decision-making in organizations. Dwyer's (2013) research on communication in business settings highlights that clear and persuasive writing contributes to career progression as it reflects an individual's professionalism and competency. Furthermore, professional writing is often the primary medium through which businesses interact with stakeholders, making it a critical tool for maintaining corporate image and client relations (Dias *et al.*, 2013).

I.1.2.3. Personal Expression

Writing as a tool for personal expression extends beyond academic and professional settings, offering a medium for self-exploration, reflection, and emotional expression. Pennebaker and Smyth (2016) found that expressive writing, such as journaling, can have therapeutic benefits, aiding in emotional regulation and personal growth. Similarly, Adams (1990) discusses how writing can serve as a form of self-therapy, helping individuals process experiences and articulate thoughts and feelings. King (2000) asserts that creative writing, in particular, fosters imagination and self-awareness and can be a powerful tool for personal development.

I.2. The Elements of Writing

Effective writing encompasses several interconnected elements that contribute to the overall quality and impact of written communication. From the fundamental building blocks of grammar and syntax to the finer nuances of style and tone, each element plays a crucial role in shaping a well-crafted piece of writing.

I.2.1. Grammar and Syntax

Grammar and syntax are crucial for structuring and organising language in writing (Chomsky, 1957). They include rules for sentence construction, punctuation, and word arrangement, ensuring messages are clear and meaningful (Beard *et al.*, 2009). Proper grammar enhances clarity, coherence, and readability in writing (Silva, 1993). Reid and Byrd (1998) stress that good grammar and syntax are vital for accurately conveying meaning, as mistakes can cause misunderstandings and lower the quality of the writing.

I.2.2. Vocabulary

The choice of vocabulary significantly affects the effectiveness and accuracy of writing (Nation, 2001). A wide range of vocabulary allows writers to choose precise words for nuanced meanings and better reader engagement (Jenkins, 2014; Olinghouse & Wilson, 2012). Olinghouse and Wilson (2012) also emphasise the importance of using vocabulary that suits the intended tone and purpose of the writing. Varied and precise vocabulary improves clarity and impact, appealing to different audiences and contexts.

I.2.3. Cohesion and Coherence

Cohesion and coherence are keys to successful writing, ensuring ideas are presented logically and understandably (Flower & Hayes, 1980). Writers should organise their thoughts coherently to guide readers smoothly through the text. Cohesion is achieved by logically structuring sentences and paragraphs (Flower & Hayes, 1980), while coherence involves connecting ideas for a smooth information flow (McCutchen, 1996). These elements together improve the readability and understanding of the text.

I.2.4. Style and Tone

Style and tone involve tailoring writing to specific audiences and purposes (Langer, 2001). Writers adjust style and tone by choosing suitable language, sentence structures, and rhetorical devices to elicit the desired responses from readers. Bereiter (1987) argues that different writing styles and tones help effectively engage and connect with various audiences. Matching style and tone to the purpose and audience enhances the persuasiveness and impact of the writing.

I.3. Process of Writing

The process of writing encompasses several distinct stages, each crucial for the development of effective written communication.

I.3.1. Planning

Planning, prewriting or ideation, is the foundational stage where writers generate ideas, gather information, and plan their writing. It involves brainstorming, researching, and organising thoughts. According to Hayes and Flower (2016), planning is critical as it sets the direction and tone for the entire writing process. It allows writers to explore their thoughts and establish a clear purpose for their writing.

I.3.2. Drafting

During drafting, writers convert their ideas into a preliminary text. This stage involves writing initial versions of the document, focusing on getting ideas down on paper. Elbow (1998) emphasises that drafting is about expressing ideas without worrying about perfection. It is a stage for creativity and exploration, where the writer's main aim is to build a framework for their ideas.

I.3.3. Revising

Revising involves re-seeing and re-thinking the draft, focusing on improving the content, organisation, and flow of the writing. It is about making changes to enhance clarity, depth, and meaning. Revision is where the real writing happens. It is a process of refining and clarifying ideas that is critical for developing effective and coherent writing (Sommers, 1982).

I.3.4. Editing

This final stage involves making corrections and changes at the sentence level, focusing on grammar, punctuation, spelling, and formatting. Lunsford (2007) highlights that editing and proofreading are essential for ensuring the professionalism and readability of the text. They are the final steps in polishing the writing to make it ready for the audience.

I.4. Types of Writing

Diverse forms of writing cater to various purposes, styles, and audiences, each serving a unique function in communication. From the captivating narratives of storytelling to the precision of technical documentation, etc., understanding the characteristics of different types of writing is essential for effective expression.

I.4.1. Narrative Writing

Narrative writing focuses on storytelling and is found in novels, short stories, and autobiographies. It emphasises plot, character development, and setting to engage and entertain readers with a story (Wasser, 2021). Abbott (2008) underlines the importance of elements like plot and character in narrative writing. Labov (1972) highlights the significance of narrative structure in crafting compelling stories. Narrative writing is common in literature and daily communication.

I.4.2. Descriptive Writing

Descriptive writing aims to provide detailed images of people, places, objects, or events. It seeks to create a vivid picture in the reader's mind through sensory descriptions. Hemphill (2011) notes the importance of using rich details in descriptive writing. Lounsberry (1990) discusses effective techniques like metaphors and similes to enhance imagery.

I.4.3. Expository Writing

Expository writing is informative and based on facts, as is typical in textbooks, business writing, and manuals. Its goal is to explain or inform. Kolin (2009) emphasises the need for clarity and directness in expository writing. Tuman (1992) points out that expository writing requires logical structure and an organised presentation of facts.

I.4.4. Creative Writing

Creative writing covers genres like fiction, poetry, and drama, characterised by originality and expressiveness. Brande (1934) talks about the creative process and literary devices in creative writing. O'Connor (1969) offers insights into fiction writing techniques, stressing character development and narrative voice.

I.4.5. Technical Writing

Technical writing includes manuals, reports, and instructions, often in scientific or technical fields. Markel (2012) describes it as focused on clarity, precision, and conciseness. Alley (2018) stresses the importance of audience awareness in technical writing to communicate complex information effectively.

I.4.6. Persuasive Writing

Persuasive writing aims to convince the reader to agree with a viewpoint or take action. It includes advertising, opinion pieces, and political speeches. Cialdini (2009) outlines persuasive techniques like logic and emotional appeals. Perloff (2016) discusses the role of persuasive writing in influencing public opinion and behaviour.

I.4.7. Academic Writing

Academic writing is formal and structured and is used in scholarly articles and reports. Swales and Feak (2004) note its adherence to specific citation styles and evidence-based arguments. They discuss its formal tone and logical structure.

I.5. Writing Skill in TEFL

Developing the writing skill in teaching English as a foreign language (TEFL) presents various challenges and requires strategic approaches. This section explores the linguistic and psychological constraints faced by learners, strategies to overcome these challenges, different teaching approaches, and the complexities of assessing and evaluating the writing skill in TEFL contexts.

I.5.1. Challenges and Strategies

Writing skill development in TEFL encounters diverse challenges, both linguistic and psychological, which necessitate targeted strategies for effective pedagogy.

I.5.1.1. Linguistic Constraints in EFL Writing

Linguistic constraints are a major challenge in EFL writing. Ferris (2004) identifies issues such as limited vocabulary, difficulties in grasping complex grammatical structures, and the inability to use varied sentence patterns as common among EFL learners. These constraints often lead to errors in syntax, morphology, and punctuation, which can significantly hinder effective communication. Silva (1993) further elaborates on the struggles with rhetorical and discourse structures faced by EFL students, particularly when these structures differ significantly from their native languages.

I.5.1.2. Psychological Constraints in EFL Writing

Psychological factors also play a crucial role in the EFL writing process. Horwitz (2001) discusses the impact of language anxiety, which can severely limit a student's ability to express themselves in writing. This anxiety is often compounded by a fear of making mistakes and a lack of confidence in using the English language. Tsui (1996) emphasises the importance of motivation and attitude in language learning, noting that students with a positive attitude towards English are more likely to engage actively in writing tasks.

I.5.1.3. Strategies to Overcome Linguistic and Psychological Constraints

Addressing these constraints requires a multifaceted approach. Nation (2001) suggests extensive reading programmes to enhance vocabulary and expose students to various grammatical structures. This can also aid in familiarising students with different writing styles and genres. To combat psychological barriers, Oxford (1990) recommends creating a supportive classroom environment that encourages risk-taking and experimentation with language. Regular feedback, peer collaboration, and writing workshops can help build confidence and reduce anxiety in EFL learners.

I.5.2. Approaches to Teaching Writing in EFL Context

Navigating the diverse landscape of teaching writing in a TEFL context requires thoughtful consideration of various pedagogical approaches, each offering unique perspectives on skill development.

I.5.2.1. Product-Based Approach

The product-based approach is centred around the final written product, with an emphasis on imitating model texts. Raimes (1983) describes how this approach focuses on form, accuracy, and the correct use of language structures. According to Tompkins (2000), it often involves practicing set formats and structures, which can be particularly useful for learners preparing for specific exams or needing to master conventional forms of writing, such as business letters or academic essays.

I.5.2.2. Process-Based Approach

The process-based approach to EFL writing focuses on the various stages of writing, emphasising the development of writing as a skill over time. Zamel (1983) was a pioneer in advocating this approach, highlighting the importance of drafting, revising, and editing. According to Grabe and Kaplan (2014), this approach encourages students to view writing as a recursive process where feedback and revision play critical roles. It allows EFL learners to focus on expressing ideas, organising thoughts, and refining their language use over successive drafts.

I.5.2.3. Genre-Based Approach

The genre-based approach, as discussed by Hyon (1996), involves teaching students the conventions and styles of specific genres of writing. This approach is beneficial for helping EFL learners understand the context, audience, and purpose of different types of texts, whether they be academic essays, reports, narratives, or other forms. Paltridge (2001) emphasises that genre-based instruction helps students recognise and produce the structures and language typical of various genres, thereby enhancing their ability to communicate effectively across different writing contexts.

I.5.3. Assessment and Evaluation of the Writing Skill

Assessing and evaluating the writing skill in TEFL involves a nuanced consideration of various methods, as each offers distinct insights into learners' abilities and progress.

I.5.3.1. Formal Assessment

Formal assessment in EFL writing focuses on the ongoing evaluation of students' progress and needs. Ferris & Hedgcock (2014) emphasise the importance

of formal assessment for providing constructive feedback and guiding learners through their developmental stages of writing. This can include peer reviews, teacher-student conferences, and writing portfolios. Cumming (2013) suggests that formal assessments help identify specific areas where students need more support, allowing for targeted instruction and improvement.

I.5.3.2. Informal Assessment

Informal assessment in EFL writing involves evaluating students' writing abilities at the end of an instructional period. Weigle (2002) discusses standardised tests such as TOEFL and IELTS, which are widely used for informal assessment in academic contexts. These tests typically assess students' abilities to produce coherent, well-structured, and grammatically accurate writing. Hughes (2003) highlights that while these tests provide a standardised measure of writing ability, they may not fully capture a student's proficiency or the nuances of their writing style.

I.5.3.3. Alternative Assessment Methods

Alternative assessment methods have gained attention for their potential to provide a more holistic view of EFL learners' writing abilities. Hamp- Lyons and Condon (1993) advocate for portfolio-based assessments, where a collection of a student's work over time is evaluated. This method allows for a more comprehensive assessment of the learner's the writing skill and progress. Additionally, self-assessment and peer-assessment techniques, as discussed by Topping (2003), can empower students to critically engage with their own and others' writing, fostering a deeper understanding of the writing process.

I.5.3.4. Challenges in EFL Writing Assessment

Assessing writing in EFL contexts is fraught with challenges. Shaw & Weir (2007) discuss the complexity of ensuring fairness and reliability in assessments, particularly when dealing with a diverse range of linguistic and cultural backgrounds. Additionally, Knoch & Chapelle (2018) highlight the difficulties in balancing the focus on form (grammar, vocabulary) versus meaning (content, organisation) in writing assessments.

Assessment and evaluation of the writing skill in EFL contexts encompass a range of methods, each with its own strengths and limitations. Effective assessment strategies must be carefully chosen and implemented to accurately gauge learners' writing abilities and guide their continued development in writing proficiency.

Conclusion

This chapter has articulated the intricate nature of writing as a skill, as it has emphasised its cognitive, linguistic, and social components. It has dissected the essential elements of writing, from grammar and syntax to style and tone, and examined the stages of the writing process. The chapter has highlighted the importance of writing in various contexts, demonstrating its role in academic, professional, and personal spheres. Ultimately, it underscores writing as a dynamic and strategic skill, crucial for effective communication and expression in diverse settings.

CHAPTER-II. LLMs and AI

Introduction

This chapter delves into the dynamic and evolving realm of AI, a pivotal area in modern technological advancement. It aims to demystify AI by presenting it as a complex system designed to emulate human cognitive functions. Covering fundamental concepts, key elements, and diverse applications, the chapter spans topics like machine learning, robotics, natural language processing (NLP), and cognitive computing. The focus is on providing a comprehensive understanding of AI's role in technology and its widespread impact across various sectors.

II.1. Intelligence

Understanding intelligence, a multifaceted concept covering cognitive abilities, problem-solving, learning capacity, and adaptability, has evolved with theories exploring its various elements (Gardner, 1983; Sternberg, 1985; Cattell, 1987). Gardner's theory of multiple intelligences (1983, 1999) proposes that intelligence exists across different areas, challenging the idea of it as a singular entity measured only through standardised tests. Intelligence also encompasses understanding complex information, reasoning, planning, problem-solving, abstract thinking, learning from experiences, adapting to new environments, generating ideas, and effective social interaction. In fields like psychology and education, traditional psychometric methods, such as IQ tests, have been critiqued for focusing narrowly on certain cognitive abilities and cultural biases (Sternberg, 1985; Cattell, 1987). Recognising intelligence as diverse and complex broadens appreciation for human abilities, underscoring the importance of valuing various intelligences in educational and societal contexts (Gardner, 1999).

II.2. Defining Artificial Intelligence

Defining AI involves encapsulating the complex and multifaceted nature of systems designed to emulate human cognitive functions. The following definitions offer insights into the concept. Russell and Norvig (2022) say AI is about making computer systems that can do tasks requiring human intelligence. This includes learning, solving problems, recognising patterns, and making decisions. Additionally, Nilsson (1998) defines AI as making intelligent machines that copy human mental processes like learning from experiences, adapting to new information, and making decisions in different areas. This definition focuses on machines showing human-like intelligence. Moreover, Poole *et al.*, (1998) describe AI as a branch of computer science that develops algorithms and systems enabling machines to understand their surroundings, process data, learn from experiences, and make decisions or do tasks on their own. These definitions together highlight AI's wide scope, from copying human cognitive skills to creating systems that can

learn and make decisions. This shows the variety of uses and ongoing progress in the field of AI.

II.3. Elements and Applications of AI

The elements of AI are the basic components or main areas that combine to form the wider field of AI (Russell & Norvig, 2022). These elements represent different aspects of AI, each focusing on specific functions, methods, or technologies. They play a crucial role in the development of AI that resembles human intelligence, or in enabling machines to solve problems, make decisions, and learn from their mistakes (Russell & Norvig, 2022).

II.3.1. Machine Learning

Machine learning is about creating algorithms and models that allow machines to learn from data and evolve over time without direct programming (Goodfellow *et al.*, 2016). It includes different methods like supervised learning, unsupervised learning, reinforcement learning, and deep learning. Machine learning is used in many areas, such as recommending products, predicting trends, recognising images and speech, and self-driving cars (Mitchell, 1997).

II.3.2. Natural Language Processing

NLP helps computers understand, interpret, and produce human language in a meaningful and context-appropriate way (Manning & Schütze, 1999). It involves techniques for understanding language, creating language, analysing sentiments, translating languages, and extracting information. NLP is used in virtual assistants like Siri and Alexa, language translation services, and text analysis tools (Jurafsky & Martin, 2020).

II.3.3. Robotics

Robotics is a cross-disciplinary field that deals with designing, making, operating, and using robots (Arkin, 1998). It combines mechanical engineering, electrical engineering, computer science, and AI to build machines that can do tasks on their own or with some help. Robotics is used in manufacturing, social robots, medical robots, and space exploration robots (Siciliano & Khatib, 2016).

II.3.4. Computer Vision

Computer vision focuses on allowing computers to understand and interpret visual information from pictures or videos (Szeliski, 2022). This area includes recognising images, detecting objects, segmenting images, and tracking videos.

Computer vision is applied in surveillance, autonomous vehicles, medical imaging, and augmented reality (Forsyth & Ponce, 2012).

II.3.5. Expert Systems

Expert systems use knowledge engineering to imitate the decision-making of human experts in specific areas (Giarratano & Riley, 1989). They depend on rules, reasoning, and specific knowledge to provide smart advice or solutions. Expert systems are used in healthcare diagnosis, financial advice, troubleshooting, and process control (Jackson, 1999).

II.3.6. Speech Recognition

Speech recognition is about converting spoken words into text that machines can read. It analyses audio to identify words, letting machines understand and respond to human speech (Jurafsky & Martin, 2020). Techniques like hidden Markov models and neural networks have greatly improved the accuracy of speech recognition (Huang *et al.*, 2001).

II.3.7. Knowledge Representation

Knowledge representation organises information so that machines can understand it, helping them reason and solve problems (Brachman & Levesque, 2004). Methods like semantic networks and ontologies structure knowledge which allows computers to effectively process complex information (Hayes-Roth, 1985).

II.3.8. Neural Networks

Neural networks are computer models similar to the human brain's structure, with connected nodes (neurons) in layers processing data (Haykin, 1999). Deep neural networks, with many layers, have transformed AI applications in areas like image recognition and autonomous driving (Goodfellow *et al.*, 2016).

II.3.9. Planning and Scheduling

Planning and scheduling in AI use algorithms to help machines decide on action sequences to reach goals (Russell & Norvig, 2022). They often use search methods and optimisation algorithms for efficient planning in fields like manufacturing and robotics (Ghallab *et al.*, 2004).

II.3.10. Reinforcement Learning

Reinforcement learning is a type of machine learning where an agent learns to make decisions in an environment to get rewards (Sutton & Barto,

2018). This trial-and-error method helps the agent develop strategies for applications like gaming, robotics, and autonomous systems (Kaelbling *et al.*, 1996).

II.3.11. Cognitive Computing

Cognitive computing involves the development of computer systems that mimic the human brain's cognitive abilities to understand, reason, and learn from data (Asgher, 2023). It encompasses techniques from AI, machine learning, NLP, and pattern recognition to solve complex problems (Asgher, 2023).

II.3.12. Pattern Recognition

Pattern recognition focuses on the identification of regularities or patterns in data through automated techniques. It involves the extraction of meaningful information, such as identifying shapes in images, detecting anomalies, or recognising trends in datasets (Duda, Hart, & Stork, 2000).

II.3.13. Autonomous Vehicles

Autonomous vehicles refer to vehicles equipped with advanced sensors, AI algorithms, and computing systems that enable them to navigate and operate without human intervention (Guo & Wen, 2023). They utilise technologies like computer vision, machine learning, and sensor fusion to perceive their environment and make driving decisions (Russel & Norvig, 2022).

II.3.14. Data Mining

Data mining involves extracting insights or patterns from large datasets. It utilises various techniques, including statistical analysis, machine learning, and pattern recognition, to discover hidden patterns, correlations, or trends in data (Han, Kamber, & Pei, 2011).

II.3.15. Game Playing Algorithms

Game-playing algorithms aim to create AI agents capable of making strategic decisions and playing games against humans or other AI opponents. They employ various AI techniques, such as search algorithms, decision trees, reinforcement learning, and neural networks, to develop intelligent game-playing agents (Russell & Norvig, 2022). This can be found in several games, such as chess.

II.4. Introduction to the History of AI

The concept of AI has captivated human imagination and scientific curiosity for centuries, but it was not until the mid-20th century that AI emerged as a formal field of study. The roots of AI can be traced back to ancient mythologies, where mechanical beings with intelligence were imagined (Mayor, 2018). However, the scientific pursuit to develop intelligent machines began much later.

II.4.1. The Genesis of AI: The 1940s to the 1950s

Influenced by various fields, AI began taking shape in the mid-20th century. Alan Turing's early work, especially his paper on Computable Numbers (1937), laid the groundwork by introducing the idea of a universal machine, a precursor to modern computers. Along with Claude Shannon's work on digital circuit design theory (1938), this set the stage for AI's development. Norbert Wiener's Cybernetics (1948) offered a way to understand control and communication in animals and machines, shaping early AI concepts. Meanwhile, John von Neumann's work on computer architecture created a practical approach to building intelligent machines (von Neumann, 1945).

II.4.2. Growth and Setbacks: The 1960s to the 1970s

The 1960s marked a period of significant achievements in AI. Joseph Weizenbaum's development of ELIZA in 1966 at the Massachusetts Institute of Technology was a notable advancement, demonstrating the potential of NLP. ELIZA, capable of simulating conversation at a basic level, was a pioneering step towards the development of chatbots and conversational agents (Weizenbaum, 1966). Another landmark achievement was Terry Winograd's creation of SHRDLU in 1972, a programme that could understand and manipulate blocks of various shapes, sizes, and colours through natural language commands. This showcased considerable advancements in AI's capabilities in problem-solving and language understanding (Winograd, 1972).

Despite these early successes, the 1970s brought about a period of disillusionment in AI, often referred to as the first AI Winter. This era was characterised by a substantial reduction in funding and interest in AI research. The causes of this decline were complex, including overly optimistic predictions from the previous decade that failed to materialise (Crevier, 1993), technical limitations in the field, and a growing recognition of the intricacies involved in replicating true human intelligence (Brooks, 1991).

A significant challenge faced during this period was the realisation that early AI systems lacked the capability to comprehend context and common-sense

knowledge. This critical issue was prominently highlighted in Hubert Dreyfus' critique of AI (Dreyfus, 1972), leading to a reassessment of the methodologies and expectations within the AI community.

The term "artificial intelligence" was officially coined at the Dartmouth Conference in 1956. This conference, organised by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon, was a pivotal gathering of leading thinkers in the field. The attendees aimed to discuss and define the contours of this emerging field (McCarthy, Minsky, Rochester, & Shannon, 1955). The Dartmouth proposal was groundbreaking, suggesting that every aspect of learning or any other feature of intelligence could, in principle, be precisely described to the extent that a machine could be made to simulate it (McCarthy *et al.*, 1955). This landmark conference is widely recognised as the inception point of AI as an academic discipline.

II.4.3. Revival and Diversification: The 1980s to the 1990s

The 1980s experienced a revival in AI, particularly through the success of expert systems. These systems, designed to replicate the decision-making skills of human experts, became some of the first AI applications to gain widespread commercial usage (Shortliffe, 1976; McDermott, 1982). The most notable example was the MYCIN system, initially developed in the early 1970s but gaining prominence in the 1980s. MYCIN helped doctors diagnose bacterial infections and suggest appropriate antibiotics (Shortliffe, 1976). Another important system was XCON (or R1), developed by John McDermott and his team at Carnegie Mellon University, which Digital Equipment Corporation used to configure computer systems (McDermott, 1982).

This period also marked the increasing significance of machine learning in AI. The creation of algorithms that could learn from data instead of relying solely on pre-set rules represented a major shift in AI. This change was partly driven by the limitations recognised in rule-based systems and the growing availability of digital data. A pivotal contributor to this evolution was John Hopfield, who in 1982 introduced the Hopfield network, a type of recurrent neural network functioning as a content-addressable memory system (Hopfield, 1982).

The late 1980s and 1990s witnessed further progress in machine learning. The popularisation of backpropagation algorithms (Rumelhart, Hinton, & Williams, 1986) for training neural networks laid the foundation for the subsequent deep learning revolution. Additionally, the creation of the Support Vector Machine by Cortes and Vapnik in 1995 made a significant impact on the field.

II.4.4. The Modern Era: AI in the Age of Big Data and Deep Learning

The 2000s initiated the 'Big Data' era, bringing a transformative impact on AI. The dramatic increase in data—in terms of volume, velocity, and variety—provided essential resources for advanced AI algorithms. A key feature of this era was the ability to utilise large datasets for machine learning, particularly for training deep neural networks. Laney's 3Vs model (volume, velocity, and variety) captured the challenges and possibilities brought by big data (Laney, 2001), and its significance for AI was immense, as explored in Mayer-Schönberger and Cukier's (2013) work "Big Data: A Revolution That Will Transform How We Live, Work, and Think."

A notable development during this time was the resurgence and success of deep learning, which is a part of machine learning involving deep neural networks. The groundbreaking research by Hinton and Salakhutdinov (2006) on reducing data dimensionality with neural networks has renewed interest in deep learning. This renewed interest led to significant advancements, such as the creation of AlexNet by Krizhevsky, Sutskever, and Hinton (2012), which greatly improved performance in image recognition tasks.

Another landmark achievement was DeepMind's AlphaGo (Silver *et al.*, 2016), which beat a world champion in the complex board game Go, an accomplishment that many had thought was decades away. This victory highlighted the capabilities of deep learning, especially reinforcement learning, in addressing intricate and practical challenges.

II.4.5. The Emergence and Significance of LLMs

In recent years, LLMs have become a significant focus in AI. These models are notable for their enormous number of parameters and expansive training datasets, demonstrating impressive abilities in NLP. Key developments in LLMs include models like BERT (Bidirectional Encoder Representations from Transformers), developed by Jacob Devlin, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova at Google AI Language, and the GPT series by OpenAI (Radford *et al.*, 2019). These models have shown extraordinary skills in understanding and generating human language, transforming tasks such as language translation, content creation, and conversational AI.

The evolution of LLMs has significantly influenced technology and society. BERT's innovation was its bidirectional training, which allowed for a better understanding of a word's context in a sentence compared to earlier models (Devlin *et al.*, 2018). GPT-3, with its 175 billion parameters, marked a considera-

ble leap in the scale and capability of LLMs. It could perform various language tasks with minimal task-specific training (Brown *et al.*, 2020).

These advancements have paved the way for new AI applications, including advanced chatbots and sophisticated content generation tools. They also raise important ethical and societal issues, such as potential biases in AI models and the risk of misuse (Bender *et al.*, 2021). The rapid progress of LLMs highlights the need for continuous research and discussion on AI governance and ethical standards.

II.4.6. LLMs in 2023

In 2023, OpenAI's ChatGPT 3.5 and ChatGPT 4 have marked significant advancements in the realm of LLMs (Kasneci *et al.*, 2023). Built on GPT technology, these models stand out for their generative response capabilities (Thorp, 2023). A notable feature of ChatGPT is its knowledge cutoff, which limits the inclusion of web data beyond a certain date in its training, ensuring the information it generates is from a defined and reliable dataset (Kasneci *et al.*, 2023).

GPT-3.5 and GPT-4 differ mainly in their text comprehension and generation abilities. GPT-4, being the newer iteration, exhibits superior performance due to its training on a more extensive dataset and a larger number of parameters (McGeorge, 2023). This allows it to learn more complex language patterns, enhancing its ability to produce coherent and contextually relevant text (Kasneci *et al.*, 2023). Despite their advancements, both models share a similar knowledge cutoff, restricting their ability to generate responses based on real-world events or information beyond their training period (McGeorge, 2023).

Google's contribution to LLMs, Bard, is designed primarily for dialogue applications. Unlike ChatGPT models, Bard does not have restrictions regarding accessing the web for generating responses (Kumar *et al.*, 2023). This feature potentially allows Bard to provide more up-to-date information and responses based on the latest web content, offering a different approach to information retrieval and interaction compared to ChatGPT (Kumar *et al.*, 2023).

Conclusion

In concluding this chapter on AI, the vast and intricate landscape of AI has been thoroughly examined, highlighting its significance in modern technology. The chapter explored AI's fundamental concepts, diverse applications, and the evolution of its theories and practices. From machine learning to cognitive computing, AI's role in shaping various industries and its potential for future developments have been underscored. This chapter serves as a comprehensive over-

view that offers insights into AI's transformative impact on technology and society.

CHAPTER-III. AI and TEFL

Introduction

The introduction of AI in TEFL has brought new opportunities for both teachers and students. This chapter examines how AI is changing teaching methods and learning experiences in TEFL. It looks at how AI supports the growth of educators and learners by improving language teaching, creating individualised learning experiences, and offering tools for skill development. Based on recent research, this chapter aims to provide a detailed overview of AI's significant and changing role in this area.

III.1. Artificial Intelligence and the Writing Skill

The intersection of AI and technology in the field of academic English writing is a rapidly evolving area of study, with recent research shedding light on its impacts. In Indonesia, Zulfa *et al.* (2023) conducted a qualitative study at a university, revealing a significant enhancement in students' writing skill due to the use of various technology tools. This improvement was not just in grammatical accuracy but also in the overall coherence and cohesion of their essays. Similarly, Al Mahmud's study (2023) in Saudi Arabia focused on the use of Wordtune, an AI-driven application, and its impact on EFL students' writing proficiency. This study highlighted the potential of AI tools to improve lexical richness and syntactic complexity, which are crucial components of proficient writing in a second language. In a different context, Marzuki *et al.* (2023) gathered insights from EFL teachers in Indonesia, who observed notable improvements in students' writing, particularly in terms of content organisation and quality, following the use of AI writing tools. This perspective aligns with Zhao's (2023) technical review of Wordtune, which emphasised the tool's ability to assist EFL writers in achieving a more natural and effective flow in their written English. To emphasise the role of AI in language instruction, Song and Song (2023) conducted a mixed-methods study in China, assessing the impact of AI-assisted tools like ChatGPT on EFL students' writing skill. Their findings indicated not only skill improvement but also an increase in student motivation, suggesting that AI tools could transform the landscape of language learning. However, the integration of AI in language education is not without its challenges. Fyfe (2023) raised critical ethical concerns, particularly around the issues of plagiarism and authenticity in student writing. This study serves as a reminder of the need to consider the broader ethical implications of using AI in educational settings.

III.2. Artificial Intelligence and Other Language Skills

The influence of AI extends far beyond the scope of writing skill. As educational technology continues to evolve, the role of AI in enhancing various language skills, such as speaking, reading, and listening, has become prominent.

III.2.1. The Speaking Skill

The integration of AI technologies into teaching spoken English has received significant attention in educational research. A study by Madhavi *et al.* (2023) examined the benefits of these technologies in improving students' spoken communication skill. Their experiment, involving 100 students, highlighted the superior performance of those taught using Information and Communication Technologies (ICT) and AI tools compared to traditional methods; thus, it indicates a substantial improvement in various aspects of speaking. Another dimension of this integration is explored by Cherner *et al.* (2023), who focused on AI-powered presentation platforms. These platforms provide a virtual environment for practicing public speaking skill and receiving feedback. The study analysed the effectiveness of AI-powered presentation platforms in improving public speaking skill using metrics like pitch, eye contact, and volume, thus offering insights into their potential as a tool for enhancing oral proficiency. In addition, Kang (2022) further delved into the effects of AI and native speaker interlocutors on ESL learners' speaking ability and affective aspects. The study, involving 61 ESL learners, found that interactions with both AI avatars and native speakers improved speaking abilities, but AI interactions were more beneficial in terms of accuracy, fluency, and coherence. Interestingly, low-level participants showed more improvement with AI avatars, while high-level participants benefited more from native speaker interactions. In Zhang *et al.* (2024), a study involving 131 Chinese EFL students, the use of an AI-speaking assistant, Lora, showed significant improvements in students' willingness to communicate, enjoyment of learning English, and reduced language anxiety over a six-week period.

III.2.2. The Reading Skill

The integration of AI into enhancing English reading skill is a compelling area of study in EFL education. Lestari *et al.* (2021) investigated the correlation between students' use of AI and their English reading skill at a university in Indonesia. Their study revealed a significant relationship between students' use of AI, particularly through mobile applications, and their reading skill achievements. Alshriedeh and Mohammed (2021) conducted research to understand the effect of AI programmes on EFL students' reading skill, employing the Hot Bot strategy. Their findings underscored the crucial role of reading in understanding

author content and enhancing linguistic capabilities in a foreign language. Mancheva *et al.* (2015) provided an insightful analysis of reading skill development using the E-Z Reader model. Their study focused on the differences in lexical processing proficiency between children and adult readers, highlighting the importance of orthographic knowledge in reading skill development.

III.2.3. The Listening Skill

In exploring the role of AI in enhancing EFL listening skill, several studies have made significant contributions. Suryana *et al.* (2020) investigated the use of AI mobile applications, specifically Netflix, to improve English listening skill among non-English major students. Their findings indicated Netflix as the most effective and efficient AI mobile application for this purpose. Besides, Yu *et al.* (2023) focused on the application of AI speech synthesis technology and wireless network technology in English listening teaching. They compared traditional teaching methods with AI speech synthesis technology, which revealed that AI technology notably improved students' English listening scores. Furthermore, Ghoneim and Elghotmy (2021) explored the effectiveness of an AI-based programme in enhancing EFL listening skill among primary school pupils. Their study, which included an experimental group taught using the AI programme and a control group receiving regular instruction, showed a significant enhancement in the listening skill of the experimental group.

III.3. Artificial Intelligence and the Aspects of Language

In addition to the four language skills, the impact of AI on TEFL is evident, particularly in enhancing aspects like grammar and vocabulary.

III.3.1. Artificial Intelligence and Grammar

The integration of AI into improving English grammar skills has been a focus of recent studies in the EFL context. Kim (2019) explored the effects of using AI chatbots on Korean college students' English grammar skills. The study found that participants engaging with a chatbot showed significant improvement in their grammar skills compared to those interacting with a human partner, highlighting the efficacy of AI in language learning. Another study by Alotaibi (2023) assessed the impact of AI-powered tools like Grammarly on grammar proficiency among Saudi EFL students. The research revealed Grammarly's effectiveness in identifying grammatical errors, providing explanations, and boosting writer confidence, though it also raised concerns about potential overreliance on AI. Furthermore, Beuls and Van Eecke (2023) argued for the importance of understanding the relationship between construction grammar and AI. Their work

emphasised how insights from AI can aid in operationalising, validating, and scaling constructionist approaches to language, demonstrating the reciprocal benefits of these fields in advancing intelligent language learning agents. These studies collectively suggest that AI tools can significantly enhance grammar skills in EFL learners, offering promising avenues for more effective and engaging language education.

III.3.2. Artificial Intelligence and Vocabulary

AI has proven its effectiveness in developing and enriching EFL students' vocabulary range. In the study by Wei-Xun and Jia-Ying (2024), the effectiveness of AI-driven language learning apps on vocabulary acquisition among English learners was investigated. This research highlights the potential of personalised learning experiences and feedback provided by AI apps to improve vocabulary retention and recall abilities. Another study by Liu and Chen (2023) examined the effects of an AI-based object detection translation app on EFL students' vocabulary learning. The study found that higher-ability students benefited more from this AI-based technology, indicating its effectiveness in vocabulary acquisition. Oktadela *et al.* (2023) explored the use of AI chatbots in improving students' vocabulary at SD-IT Iman Syafei Pekanbaru. The training aimed to develop interest and creativity in English by enriching vocabulary through AI chatbot applications. The results showed increased enthusiasm, happiness, and motivation among participants, demonstrating the efficacy of AI chatbots in vocabulary learning.

III.4. AI tools in TEFL

AI tools are revolutionising the field of TEFL. From enhancing interactive communication with chatbots to improving grammar and the writing skill through advanced software, AI is providing diverse and innovative methods for language learning.

III.4.1. Chatbots

Recent studies have demonstrated the efficacy of AI chatbots in enhancing EFL students' language skills. In the study by Kim *et al.* (2021), they explored the impact of AI chatbots on the speaking skill of university students in an English course. The study found that students who engaged regularly with AI chatbots showed significant improvements in their speaking abilities. Moreover, AlKhayat (2017) conducted research at an Arab university focusing on the use of chatbots for English language proficiency. The study concluded that chatbots were particularly effective in aiding students to practice English, especially with a

virtual agent. Chuah and Kabilan (2021) examined ESL teachers' perspectives on using chatbots in mobile learning environments. Their findings highlighted the usefulness of chatbots in providing immediate feedback and aiding in language practice, indicating a positive reception among educators. Furthermore, Kim (2018) investigated the role of chatbots like Elbot in improving Korean college students' English listening and reading skills. The study demonstrated that interactions with chatbots led to notable enhancements in these language skills.

III.4.2. Speech Recognition Tools

The application of automatic speech recognition in language learning is exemplified through various research studies. Chiu *et al.* (2007) created CandleTalk, a web-based tool using automatic speech recognition for speech act training, particularly aiding non-English major EFL learners in developing oral competence. Lai and Chen (2022) tested the automatic speech recognition dictation software's transcription accuracy with Taiwanese EFL students and found that it worked well for transcribing non-native speech and telling the difference between proficiency levels. Campbell and Des (2008) developed PHONLAB, an interactive multimedia tool incorporating automatic speech recognition for phonetic practice. Tested in a private EFL school, PHONLAB demonstrated high engagement and ease of use, confirming its value as a phonetic teaching resource. These studies highlight the transformative impact of automatic speech recognition technology in language education, improving speech, pronunciation, and phonetics for EFL learners.

III.4.3. Grammar and Writing Assisting Tools

AI grammar and writing assistance tools have remarkable impacts on EFL learners' writing skill. Fitria's (2021a) study on Grammarly, a descriptive qualitative research, demonstrated the tool's effectiveness in improving students' grammatical accuracy and writing quality. O'Neill and Russell's (2019) research, using a mixed-methods approach, compared students' satisfaction with Grammarly's feedback against traditional grammar feedback, finding higher satisfaction with Grammarly. Fitria's (2021b) second study reviewed QuillBot's effectiveness in paraphrasing and rewriting, highlighting its utility in creating original content and improving grammar. Lastly, Nurmayanti and Suryadi's (2023) quantitative research assessed QuillBot's role in enhancing students' ability to compose original scientific papers, emphasising its contribution to reducing plagiarism and maintaining original meaning in paraphrased content.

III.4.4. Personalised Learning Applications

Recent advancements in AI-assisted personalised language learning have significantly impacted language education, as highlighted in three key studies. Chen *et al.* (2021) systematically reviewed academic literature on AI-assisted personalised language learning, revealing Taiwanese institutions' leading role and the prevalent use of intelligent tutoring systems, NLP, and neural networks. This review emphasised personalised diagnosis, learning path creation, and material recommendations in language learning, noting students' improved outcomes and positive perceptions towards AI technologies. Additionally, Ismail *et al.* (2016) focused their study on personalised language learning systems, proposing a review and classification scheme that incorporates both language learning and technical dimensions. Their findings suggested a growing trend in cognitive-based personalisation and the potential benefits of integrating more adaptive learner models and complex contextual language tasks. Chrysafiadi *et al.* (2022) explored mobile-assisted language learning, emphasising adaptivity and personalisation to students' needs. Their system, which included a comprehensive domain model and a user model, used machine learning techniques for error diagnosis and fuzzy logic for personalised feedback, showing encouraging results in educational effectiveness.

III.4.5. Translation Tools

In the realm of language learning, the integration of translation tools has been a focal point of research, as evidenced by several studies. Li *et al.* (2023) explored the efficacy of an AI-based online translation platform, highlighting significant advancements in query preservation and accuracy. Kolhar and Alameen (2021) examined the impact of a machine translation system integrated with classroom technology, noting improvements in student engagement and learning outcomes. Tsai (2019) investigated Google Translate's role in enhancing English draft quality for Chinese EFL students, emphasising its effectiveness in vocabulary and writing completion. Cancino and Panes (2021) also found Google Translate to increase syntactic complexity and accuracy in writing among Chilean EFL high school learners. These studies collectively underscore the transformative impact of AI-powered translation tools in the field of English language education.

III.5. Challenges in Integrating AI into TEFL

Recent studies provide crucial insights into the challenges of integrating AI in EFL classrooms. Sumakul *et al.* (2022) explored Indonesian EFL teachers' perceptions of AI, revealing a general positivity towards its educational benefits but also highlighting concerns regarding student motivation and teacher compe-

tence. Wang and Cheng (2021) identified key barriers to implementing AI in Hong Kong's K–12 education, categorising them as first- and second-order challenges and emphasising their interrelated nature. Hu (2022) examined the efficacy of precision education in AI-supported environments at the university level, focusing on the correlation between platform usage and academic results. These studies collectively shed light on the multifaceted challenges of adopting AI in EFL contexts, ranging from technological and pedagogical barriers to concerns about student engagement and educational outcomes.

III.6. The Role of AI in Educator and Learner Development

The integration of AI in TEFL has been explored in various studies. Wie's research (2023) looks at how AI-mediated language instruction affects English learning achievement, motivation, and self-regulated learning among EFL learners. The results show big improvements. Another study by An *et al.* (2023) investigates EFL teachers' attitudes and intentions towards AI in middle school education, uncovering a complex mix of positivity and challenges. Furthermore, Huang and Renandya (2020) delve into the effectiveness of automated feedback in EFL writing classes for Chinese university students, particularly for those with lower proficiency, highlighting the practical utility of AI in language skill enhancement.

Conclusion

This chapter has critically examined the role of AI in the development of educators and learners in the TEFL context. The insights gleaned from various studies showcase the potential of AI as a powerful tool in language education. While AI introduces innovative teaching methodologies and learning opportunities, it also presents challenges that need to be addressed, such as ensuring equitable access and maintaining academic integrity. As the field of TEFL continues to evolve with technological advancements, it is imperative that educators and learners adapt and harness the potential of AI to enrich the learning experience and enhance language proficiency.

CHAPTER-IV. LLMs and the Writing Skill Development

Introduction

The exploration of the awareness, use, and perceptions of LLMs among Algerian EFL university teachers and learners offers a unique lens into the field of language teaching. This study aims to expound on the interactions between these stakeholders and LLMs, particularly focusing on their impact on developing the writing skill. It moves from the dimensions of LLM integration to the initial awareness and accessibility of such tools and their application in enhancing the writing skill. Additionally, it delves into the perceptions of both learners and teachers regarding the effectiveness, challenges, and potential of LLMs in consolidating the learning environment. This chapter seeks to explain the design of the study and report its findings.

IV.1. Design and Methodology

The research paradigm guiding this exploratory study is pragmatism. Pragmatism prioritises the practical application of research findings and emphasises the problem-solving aspect of research (Kurum, 2018). It recognises the value of using multiple methods to understand research problems, thus allowing for a flexible approach to research design (Arslan *et al.*, 2016). This paradigm is particularly relevant to this study on the awareness, use, and perceptions of LLMs among Algerian EFL university teachers and learners in developing the writing skill. By adopting pragmatism, the importance of practical outcomes and the application of findings in real-world settings is affirmed. In line with pragmatism, this study views truth as what works in practice and knowledge as being constructed through interactions with the world (De Waal, 2021).

The sequential mixed-methods approach employed in this study offers an advantage by allowing for a thorough exploration of the research topic (Kothari, 2004). This approach sequentially integrates quantitative and qualitative research methods and enables a multi-faced analysis that captures both the breadth and depth of the subject matter (Ivankova *et al.*, 2006; Creswell & Clark, 2017). The initial quantitative phase provides a broad, generalisable understanding of the level of awareness and use of LLMs among Algerian EFL university learners. The subsequent qualitative phase delves into the nuanced perceptions and experiences of both learners and teachers, which offer rich, contextual insights that enhance the interpretation of the quantitative data. This methodological synergy enhances the study's reliability and validity (Creswell & Clark, 2017).

The methodology of this study centres on the use of surveys as a primary tool for quantitative and qualitative data collection. Surveys are advantageous in educational research for their efficiency in gathering data from a large number of

respondents within a manageable timeframe (Punch, 2003). This method allows for the systematic collection of information regarding individuals' awareness, use, and perceptions of LLMs among Algerian EFL university teachers and learners.

IV.2. Methods

The study employs one closed-ended questionnaire and two semi-structured interviews for data collection. The questionnaire captures quantitative data on LLM awareness, use, and perceptions of the learners, while interviews provide qualitative insights into teachers' and learners' perceptions, which enrich the analysis with diverse perspectives (Moser & Kalton, 1958).

IV.2.1. Students' Questionnaire

This instrument used a closed-ended format to efficiently gather data on Algerian EFL university learners' awareness, use, and perceptions of LLMs. This instrument was fundamental in quantifying students' engagement with LLMs.

IV.2.1.1. Description of Students' Questionnaire

The aim of this questionnaire is to quantify responses for statistical analysis, facilitating the exploration of patterns and correlations related to LLMs in English writing skill development (see Appendix 1).

The questionnaire contains the following sections which detail the structured approach taken to gather data on the interaction between students and LLMs.

Section One: Demographic Information (Questions 1–4)

This section of the questionnaire aims to gather basic respondent information such as email, gender, age, and current year of study. This data enables demographic segmentation and analysis while aiding in understanding how different groups interact with LLMs.

Section Two: Experience with AI and Awareness of LLMs (Questions 5-7)

This section of the questionnaire aims to assess prior engagement with AI tools and specific awareness of LLMs. It aims to establish a baseline of familiarity and differentiate between novices and experienced users.

Section Three: Usage and Attitudes Towards LLMs (Questions 8–24)

This section of the questionnaire aims to gather detailed queries about whether participants have used LLMs, their belief in LLMs' effectiveness, types of writing tasks LLMs were used for, frequency of use, noticed improvements, chal-

lenges faced, and comfort with LLMs. This section is crucial for uncovering how LLMs are perceived and used in developing the writing skill, including preferences for LLMs over traditional learning methods.

Section Four: Additional Comments and Follow-up (Questions 25–27)

This section of the questionnaire aims to collect contact information for potential follow-up interviews and provide space for any additional comments or suggestions. This opens the door for qualitative follow-up.

The questionnaire's structured design ensures a broad yet detailed collection of data, from basic demographic information to in-depth insights on LLMs' use and perceptions. Its closed-ended format enables efficient analysis and comparison across the study's participant base, so it serves as a tool for understanding the role of LLMs in EFL education within the Algerian context.

IV.2.1.2. Administration of Students' Questionnaire

Google Forms platform was used for its user-friendly and efficient data management capabilities. The questionnaire was distributed through two primary channels. Firstly, it was published on Facebook pages frequented by the target student population, leveraging social media's extensive reach and the students' familiarity with the platform. Secondly, it was directly sent to the delegates of each "licence" class, relying on these delegates to further disseminate the questionnaire among their peers. Participants are encouraged to complete the questionnaire in a quiet, distraction-free environment at their convenience. This self-administration under comfortable conditions aims to enhance the quality and honesty of responses. Students were invited to access and complete the questionnaire via the provided links, without any imposition of a deadline. This open time-frame was designed to accommodate the diverse schedules of students while allowing them to participate at their convenience.

IV.2.2. Students' Interview

This instrument employed semi-structured interviews to delve deeper into students' qualitative insights regarding the use of LLMs in their writing development. This approach facilitated a more profound exploration of experiences, perceptions, and attitudes towards LLMs.

IV.2.2.1. Description of Students' Interview

The students' interviews are semi-structured in nature, chosen for their flexibility and depth. This format allows for open-ended responses that can reveal nuanced insights into the students' experiences, perceptions, and attitudes towards using LLMs in their writing processes. The aim is to complement the quan-

titative data collected through questionnaires with qualitative narratives that capture the complexities of LLM usage in educational contexts. The interview questions are based on the results of the questionnaire (see Appendix 2).

The interviews are conducted to capture a wide array of insights, starting with concrete examples of how LLMs have impacted students' writing processes, including both significant improvements and any encountered obstacles. This approach aims to gauge the balance between the perceived advantages and potential downsides of integrating LLMs into educational practices. Additionally, the discussions extend to changes in writing approaches influenced by LLM usage in order to determine specific enhancements in grammar, vocabulary, and overall coherence. Through these conversations, the interviews seek to assess the willingness of students to recommend LLMs to peers and gather their constructive feedback on improving LLM functionalities for educational purposes. This holistic examination strives to encapsulate the relationship between students and LLMs.

IV.2.2.2. Administration of Students' Interview

The administration of the semi-structured interviews focused on students' use and perceptions of LLMs for writing skill development and was carefully planned to ensure meaningful and insightful data collection. Participants for the semi-structured interviews were selected based on the fact that they use LLMs for writing skill development, as indicated in their questionnaire responses. The interviews were conducted online via Discord, Zoom, and WhatsApp, chosen for their convenience by the participants, who were also allowed to select their preferred interview times to facilitate their involvement by reducing potential conflicts with their academic and personal commitments. Efforts to ensure participant comfort included the option to take breaks during the interview and the freedom to communicate in their mother tongue. They were not briefed on the interview questions beforehand to encourage spontaneous responses. Each interview lasted around 8 to 12 minutes, with anonymity assured for all participants. Recording was optional and conditional on consent, and recordings were deleted after transcription. This approach prioritised ethical practices, participant comfort, and the integrity of the collected data.

IV.2.3. Teachers' Interview

This instrument uses semi-structured interviews to capture the perspectives of EFL teachers on integrating LLMs into writing instruction. This method allowed for an in-depth examination of teachers' experiences, challenges, and the pedagogical value of LLMs.

IV.2.3.1. Description of Teachers' Interview

The interviews with teachers are semi-structured, a format chosen for its flexibility in allowing open-ended responses while guiding the conversation through pre-determined questions (see Appendix 3). This approach facilitates an in-depth exploration of teachers' experiences, attitudes, and practices regarding the use of LLMs in teaching English writing. The primary aim is to understand the role and impact of LLMs in language teaching from the educators' perspective, identifying both the opportunities and challenges these technologies present in the educational context. The following sections detail the approach taken to gather ample data on the interaction between teachers and LLMs in teaching the writing skill.

Section One: Awareness

This section aims to trace the origin of teachers' awareness about LLMs in the language teaching field, setting the stage for a deeper inquiry into personal and professional engagements with these technologies.

Section Two: Use

This section delves into the practical application of LLMs in teaching, from the initial motivation to the current methods of integration. It aims to capture the diversity in LLM usage and the rationale behind incorporating these tools into writing instruction.

Section Three: Perceptions

This section aims to gather teachers' insights on the potential impacts of LLMs on student writing proficiency and learning outcomes. This explores beliefs about LLMs' ability to enhance or hinder various aspects of writing and addresses concerns regarding plagiarism and dependency.

IV.2.3.2. Administration of Teachers' Interview

For the teachers' interviews, participants were specifically chosen for their use of LLMs in teaching English writing, ensuring focused and experienced insights. The interviews, conducted via Zoom or phone based on participant preference or researcher decision, were arranged at times chosen by the teachers to accommodate their schedules, promoting a higher level of participation. Interview durations were kept brief, ranging from 10 to 15 minutes, to respect the teachers' time while allowing for in-depth discussions. Although not pre-briefed on the questions, teachers had moments within the interview to ponder their responses. Ethical considerations were paramount, with assurances of anonymity to encourage open dialogue. The option for recording was presented, with recordings to be

deleted post-transcription and accessible only to the research team. This approach balanced efficiency with a strong commitment to ethical standards, ensuring the integrity of the collected data and the privacy of the participants.

IV.3. Population and Sampling

This section delineates the study's targeted groups: Licence students and EFL teachers at Algerian universities, using mixed sampling methods to reflect insights into LLM usage in EFL contexts. This strategy ensured a broad yet focused examination of attitudes and experiences with LLMs in the same research setting and at different universities.

IV.3.1. Population

This study's population encompasses two primary categories: Licence students of English at KMUO, and teachers currently engaged in teaching Written Comprehension and Expression module at Algerian universities. The focus on these groups stems from a direct affiliation with KMUO when it comes to students and the rarity of finding teachers who incorporate LLMs in teaching the writing skill.

IV.3.2. Students' Sampling

The total number of Licence students of English at KMUO is approximately 900. From this population, a convenience and snowball sampling strategy was employed to distribute the questionnaire, aiming to capitalise on readily accessible participants while gradually expanding the reach through participant referrals (Goodman, 1961; Henry, 1990). This approach resulted in 99 initial questionnaire responses. After a careful review for relevance and coherence, 12 responses were excluded, culminating in a final count of 87 valid responses. Subsequently, a purposive sampling method was applied to select 10% of the questionnaire respondents for semi-structured interviews, totaling 7 student interviews (Malterud *et al.*, 2016). This selection was based on their active use of LLMs for writing development.

There were certain rules used to find a statistically valid sample size: a confidence level of 90%, which is equal to a Z-score of about 1.645, an assumed population proportion of 0.5 to allow for the largest sample size, and a 10% margin of error. The requisite minimum sample size, incorporating a finite population correction for a total population of approximately 900 students, was calculated to be 67 participants. This figure is predicated on ensuring that the survey findings are statistically significant within the predefined confidence level and margin of error, thereby facilitating a valid extrapolation to the wider student body

(Krejcie & Morgan, 1970). Contrastingly, the actual number of valid survey responses received amounted to 87, exceeding the calculated minimum sample size. The exceeding of the minimum required sample size not only augments the statistical robustness of the study but also enhances the generalizability and reliability of its findings.

IV.3.3. Teachers' Sampling

The sample size for teachers, though unspecified, was targeted through purposive sampling for interviews. Five teachers who actively use LLMs in their instruction were interviewed. This method was chosen due to the specificity of the criteria—teachers using LLMs in writing instruction—a practice not widely adopted across the board.

IV.4. Data Analysis Procedures

The data analysis procedures encompassed the examination of both quantitative and qualitative responses through the use of descriptive statistics and thematic analysis to ensure understanding of the findings.

IV.4.1. Data Analysis Procedure for Students' Questionnaire

The analysis of data from the students' questionnaire was conducted using descriptive statistics, a method focused on summarising and organising data in a meaningful way (Trochim, 2006). Descriptive statistics allow researchers to present the central tendencies and variability of their data set while facilitating a clearer understanding of the distribution of responses (Gravetter & Wallnau, 2017). For this particular analysis, the collected data were first extracted and organised using Google Sheets. Frequencies and percentages were then calculated to quantify the distribution of answers across the various questions. These quantitative insights were visually presented through pie charts and bar charts.

IV.4.2. Data Analysis Procedure for Interviews

The analysis of interview data employed a thematic analysis approach, which involves the identification, analysis, and reporting of themes within the data (Braun & Clarke, 2006). This approach facilitates the examination of recurring patterns within the qualitative data and the provision of a deep understanding of participants' experiences, interpretations, and realities (Boyatzis, 1998). The thematic analysis began with a careful transcription of the interviews, followed by a coding process to discern patterns and themes relevant to the research objectives. The findings were then organised and presented in narrative form, supported by quotes from the participants. To enhance the presentation and facil-

itate the comprehension of the data, tables were occasionally used to summarise key findings and thematic insights.
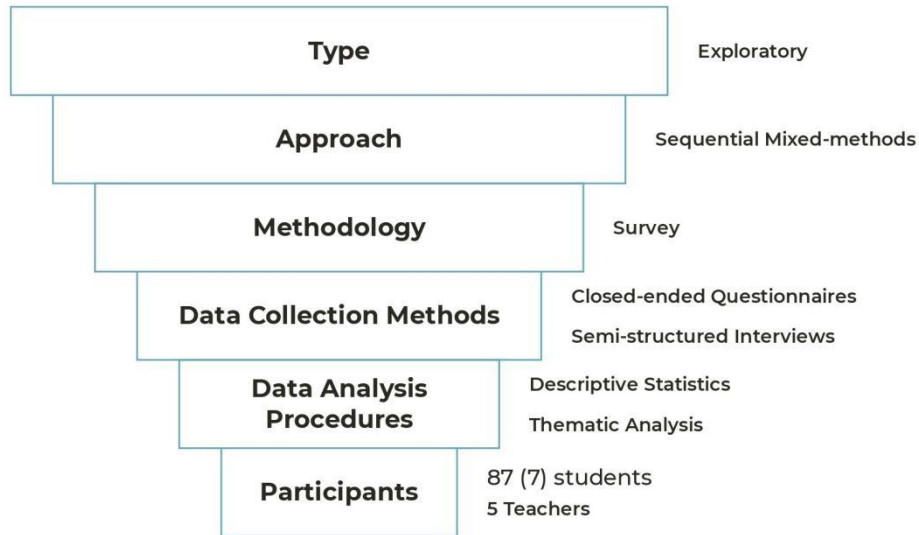

Figure 1. Research Design and Methods

IV.5. Ethical Considerations

In this study, ethical considerations were meticulously observed to ensure the respect, privacy, and confidentiality of all participants. Before collecting data, informed consent was obtained from each participant, clearly explaining the purpose of the research, how the data would be used, and their rights, including the option to withdraw from the study at any time without consequence. All personal information was anonymized to protect participants' identities, and data were handled with strict confidentiality, accessible only to the research team for analysis purposes. These measures were taken to uphold the highest ethical standards while ensuring that the research was conducted responsibly and with integrity, in alignment with institutional guidelines and ethical research practices.

IV.6. Reporting the Results and Discussion

In this part, the findings of the students' questionnaire and interview, and the teachers' interview are analysed sequentially to offer a holistic understanding of the interaction between the participants and LLMs in developing the writing skill.

IV.6.1. Results of Students' Questionnaire

This section reveals insights on EFL university learners' engagement with LLMs, including awareness, use, and perceived impacts on the writing skill. It succinctly addresses students' attitudes towards LLMs.

IV.6.1.1. Section One: Demographic Information

In the first section of the student questionnaire, participants were asked to provide their email addresses. This request aimed to establish a communication channel for potential follow-up through semi-structured interviews.

According to Table 1, the gender distribution among the respondents was also examined, revealing a significant female majority within the participant group. Specifically, the analysis showed that 78.2% of the sample were female students, while 21.8% of the sample were male students. This gender imbalance suggests a predominance of female students within the sample, possibly mirroring the demographic trends in English studies at the Licence level or indicating a greater inclination among female students to participate in academic surveys.

As shown in Table 1, The age distribution of the questionnaire respondents reveals a predominantly younger demographic, with the majority of participants falling within the 18–24 age range, accounting for 90.8% of the total responses. This indicates that the bulk of the sample consists of traditional-age university students. The remaining participants are distributed across older age groups, with 4.6% aged between 25 and 36 years and 2.3% in each of the 37–45 and over 46 age brackets.

The distribution of respondents by their current year of study indicates a significant representation from the 2nd year Licence students, with 60.9% of the total. This suggests that the majority of participants are at an intermediate stage of their undergraduate studies. First-year Licence students also contribute to the sample, comprising 23%, indicating substantial involvement from those at the beginning of their university education. The 3rd year Licence students, representing the concluding phase of undergraduate studies, account for 16.1% of the sample (see Table 1).

Table 1. Students' Demographic Information

Category	Sub-category	Percentage
Gender Distribution	Male	78.2
	Female	21.8

Category	Sub-category	Percentage
Age Distribution	18-24	90.8
	25-36	4.6
	37-45	2.3
	+46	2.3
Year of Study	1st Year Licence	23
	2nd Year Licence	60.9
	3rd Year Licence	16.1

IV.6.1.2. Section Two: Experience with AI and Awareness of LLMs

Q5: Have you ever used any AI tools for educational or personal purposes? If yes, name them.

In this section, students were initially asked about their prior use of AI tools. The responses predominantly highlighted the use of ChatGPT. Besides, Google's Bard and other AI technologies like Grammarly, Canva, and Adobe Podcast Enhance were also mentioned. Notably, 3% of the respondents explicitly stated "no," signifying no prior engagement with AI tools. The responses reflect the increasing integration of AI in educational contexts, with ChatGPT emerging as a particularly prominent tool among students for various tasks.

Q6: How would you rate your overall proficiency in using technology for educational purposes?

In exploring students' self-assessed technological proficiency for educational purposes, the respondents were given four options to best describe their comfort level as shown in Figure 2. The collected responses reveal a broad spectrum of self-perceived proficiency among the participants. Specifically, 12.6% of the respondents considered themselves not proficient in using technology for educational purposes. A larger portion, representing 43.7% of the sample, rated themselves as somewhat proficient. Meanwhile, 33.3% of the students felt proficient. The smallest group, comprising 10.3% of the sample, identified themselves as very proficient.
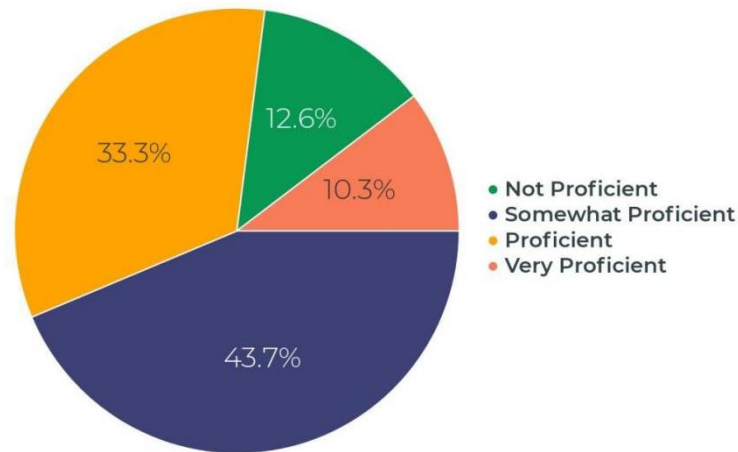
Figure 2. Students' Proficiency in Using Technology for Educational Purposes

Q7: Are you aware of what LLMs (ChatGPT-3.5, Chat-GPT4, Google's Bard, Gemini, etc) are?

When the students were asked if they knew about LLMs like ChatGPT-3.5, Chat-GPT4, Google's Bard, Gemini, and others, 100% of the students in the survey confirmed they were aware of these AI tools. This finding shows that all the students are familiar with these advanced technologies, pointing to a widespread understanding of LLMs in the student community. The fact that every student knew about LLMs highlights how common and important these AI tools have become in education. It suggests that students understand the value and potential uses of LLMs.

Q8: Have you ever read about or been taught how LLMs can be used in language learning?

When students were asked if they had ever read about or received instruction on the use of LLMs in language learning, the responses varied, indicating differing levels of familiarity with the educational applications of LLMs as shown in Figure 3. 24.1% of the respondents, indicated "yes," suggesting they had some exposure to the concepts or teachings on integrating LLMs into language learning. 32.2% of the students responded with "maybe." The majority, however, accounting for 43.7%, answered "no."
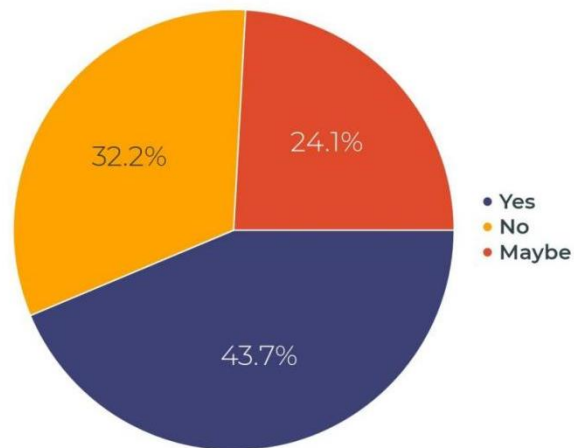
Figure 3. Students' Exposure to Instruction on LLMs in Language Learning

IV.6.1.3. Section Three: Usage and Attitudes Towards LLMs

Q9: Have you ever used an LLM for any purpose?

In response to whether they had ever used a LLM for any purpose as shown in Figure 4, a significant majority of the students, 81.6%, affirmed they had used LLMs. A smaller group, 11.5%, were uncertain, indicating "maybe," while only 6.9% of the respondents, stated they had never used an LLM.
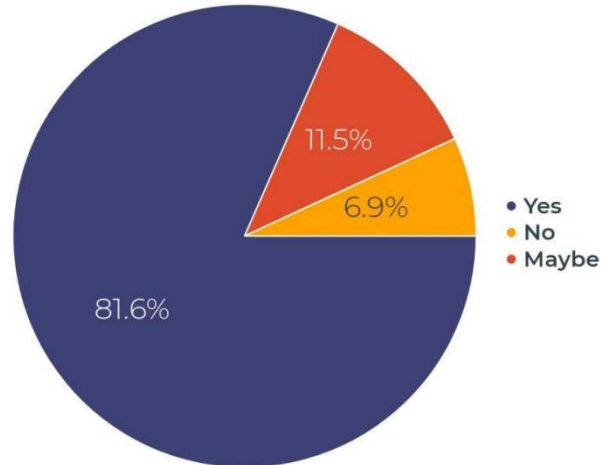

Figure 4. Students' Use of LLMs

Q10: Do you believe LLMs can be beneficial in learning and improving English writing?

When asked if they believe LLMs could be beneficial in learning and improving English writing as appeared in Figure 5, the majority of students, 82.8%, responded affirmatively, indicating a strong conviction in the potential of LLMs

to enhance the writing skill. Conversely, 17.2% of the respondents, expressed scepticism or disbelief in the benefits of LLMs for English writing improvement.
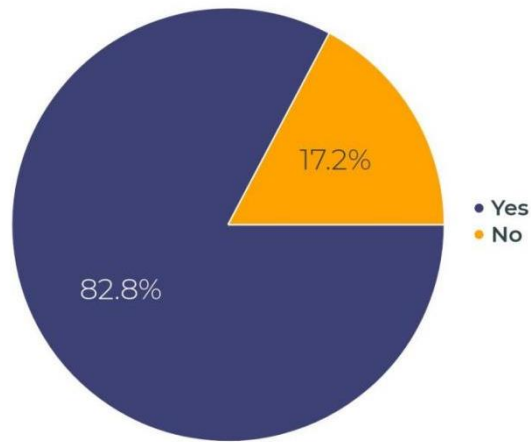
Figure 5. Students' Opinion on the Potential of LLMs in Developing Writing

Q11: Have you ever used an LLM for assistance in English writing?

Focusing on the subset of students who confirmed that they use LLMs for any purpose, totaling 72 respondents, they were further asked if they had specifically used an LLM for assistance in English writing. Figure 6 reveals a significant majority, comprising 62.1 %, affirmed they had utilised LLMs for writing assistance. Meanwhile, 13.8%, indicated "maybe." A smaller segment, 6.9%, stated they had not used LLMs for writing assistance.
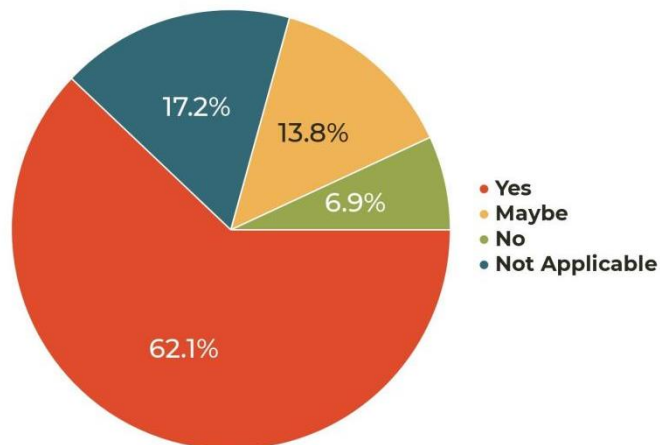
Figure 6. Students' Use of LLMs for Assistance in English Writing

Q12: If you have used an LLM for writing, what types of writing tasks did you use it for?

Among the participants shortlisted for their use of LLMs for English writing assistance, totaling 54 respondents, a question, whose results are summarised in Figure 7, was posed to delve into the specific writing tasks for which they employed LLMs. The responses revealed a wide range of uses: 38% of the participants reported using LLMs for essay and paragraph writing. Additionally, LLMs were employed for paraphrasing by 20.6% of the students and summarising by 27.6% of them. A further 13.8% of the respondents used LLMs for editing and revising drafts.
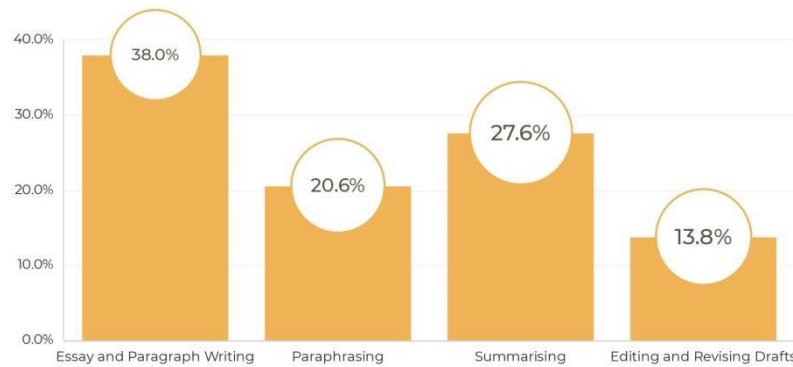
Figure 7. Distribution of LLM Usage Across Writing Tasks by Students

Q13: In which stage of writing do you use LLMs?

Continuing with the same subset of 54 respondents who use LLMs for English writing assistance, a question was asked regarding the stages of the writing process in which they employ LLMs. According to Figure 8, the responses illustrated a diverse application of LLMs throughout different phases of writing. Specifically, 31% of the participants indicated using LLMs during the planning stage. In the editing phase, 21.8% of the respondents use LLMs. Drafting was identified by 20.6% of the students as a stage where LLMs assist in developing the main content, while 18.4% of them mentioned using LLMs during revising.
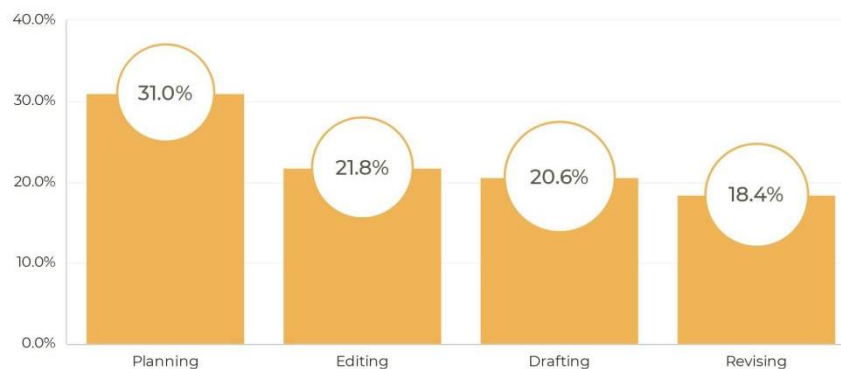
Figure 8. Students' Use of LLMs Across Different Stages of Writing

Q14: In which type of writing do you use LLMs?

When exploring the types of writing for which the subset of students who use LLMs apply these tools, responses indicated a preference for different writing contexts. Figure 9 shows that among these students, 41.4% highlighted their use of LLMs predominantly for academic writing. Personal writing was the next most common application, with 26.4% of the students using LLMs for journals, personal emails, and other non-academic texts. Creative writing, including stories and poetry, was mentioned by 14.9% of the participants. Finally, technical writing was noted by 10.3% of the respondents.
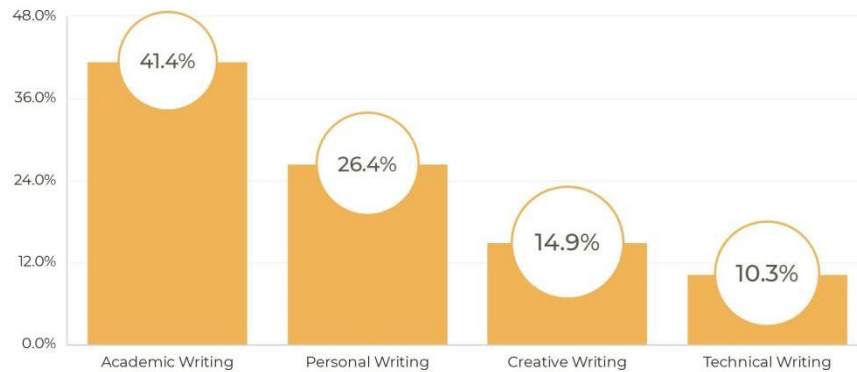
Figure 9. Students' Use of LLMs Across Different Types of Writing

Q15: What LLMs do you use in developing the writing skill?

According to Figure 10, inquiring about the specific LLMs students use to develop their writing skill yielded focused insights into their preferences. The majority, with 49.4% of the students, identified ChatGPT as their primary tool. Google's Bard was the choice for 13.8% of the respondents. Gemini was mentioned by 4.6% of the sample. Additionally, an "Others" category encompassed 3.4% of the responses, which included diverse tools such as Snapchat AI Bot, Perplexity, and Bing Chat.
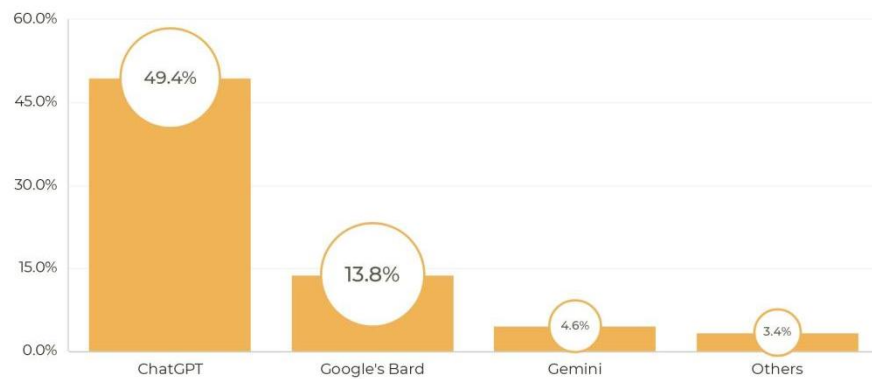
Figure 10. Preferred LLMs for Writing Skill Development Among Students

Q16: How often do you use LLMs for help with English writing?

According to Figure 11, a varied pattern emerged from the students when delving into the frequency of LLMs usage among students for developing their writing skill. A segment of the participants, 10.3%, indicated they "always" use LLMs, which denotes heavy reliance on LLMs. Another group, consisting of 14.9% of the sample, chose "often," reflecting regular but not constant use. The largest portion, with 31% of the respondents, reported "sometimes" using LLMs, indicating occasional reliance on these models. Lastly, a smaller fraction, 5.7%, answered "rarely."
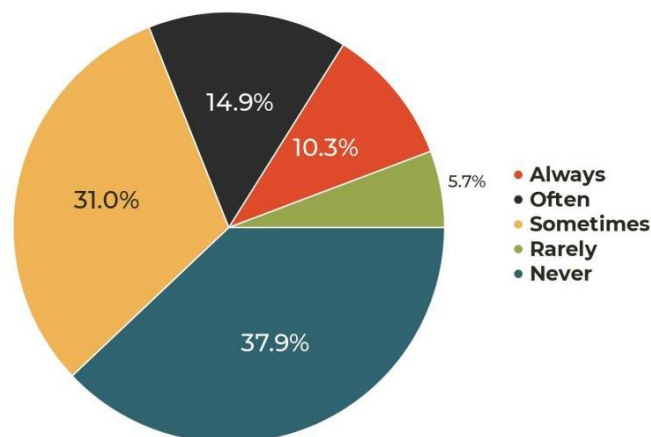
Figure 11. Frequency of LLMs Use for Writing Development Among Students

Q17: What improvements, if any, have you noticed in your writing skill after using LLMs?

Figure 12 exhibits that when exploring the effects of using LLMs on the writing skill, students reported improvements in several key areas. The most noted enhancement was in vocabulary, with 42.5 of the students observing a broader

range of words in their writing. Additionally, 32.2% of the students saw improvements in grammar and sentence structure. Moreover, clarity and coherence were enhanced for 18.4% of the students. Improvements in spelling were reported by 10.3% of students, and 9.2% of them noted increased accuracy in their writing.
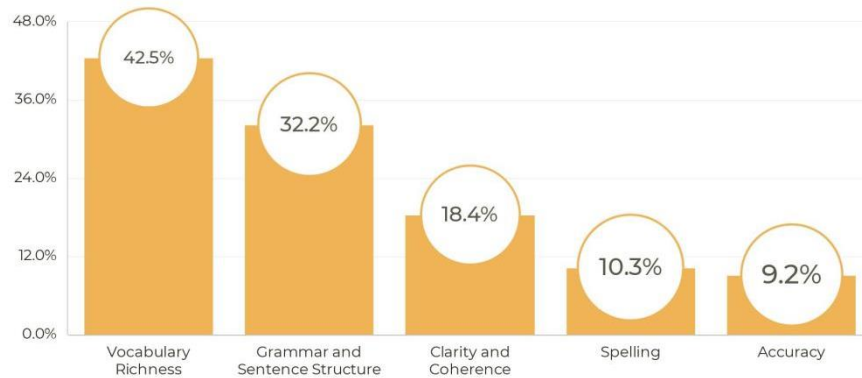
Figure 12. Students' Areas of Improvement Upon Using LLMs for Writing

Q18: How effective do you think LLMs are in improving English writing skill?

Figure 13 reveals that when students were asked about the effectiveness of LLMs in improving English writing, students' perceptions varied. A plurality of the respondents, 25.3%, considered LLMs to be slightly effective. Close behind, 24.1% of the students viewed LLMs as moderately effective. A smaller group of 8% of the students found LLMs to be very effective. Meanwhile, 4.6% of the students perceived LLMs as not effective.
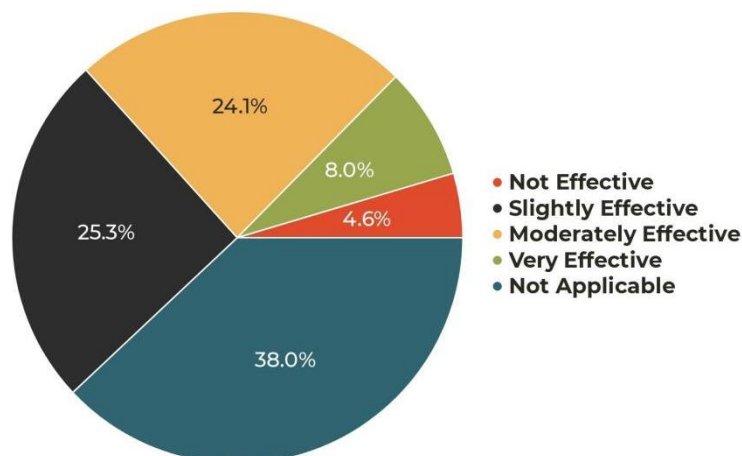
Figure 13. Students' Perceptions on LLMs' Effectiveness in Developing Writing

Q19: Have you faced any challenges while using LLMs for developing the writing skill?

Q20: What challenges, if any, have you faced when using LLMs?

Figure 14 shows that among the respondents, 23% of students reported facing challenges while using LLMs for developing the writing skill, whereas 39% did not encounter any difficulties. The challenges mentioned by those who faced issues were varied, indicating a range of obstacles to effectively leveraging LLMs for writing improvement. Common concerns included a lack of internet access, errors in LLM-generated content, and mistrust in the accuracy and reliability of the outputs. Some noted the models' tendency to produce repetitive patterns or irrelevant responses. Technical issues, such as bad internet connections and the financial cost of accessing some LLMs, were also highlighted. Furthermore, students expressed difficulties in obtaining precise, contextually appropriate answers, with some LLMs failing to grasp the nuances of the task or providing incorrect information.
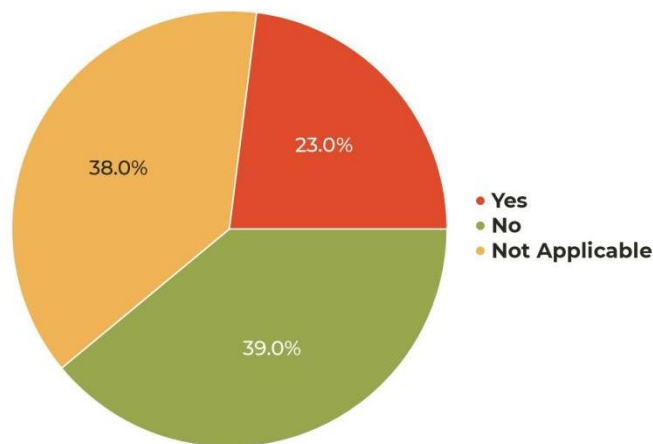
Figure 14. Student Responses to Facing Challenges with LLMs in Writing

Q21: Would you prefer traditional learning methods (e.g. using model texts, teacher's instruction/feedback, dictionary usage, etc.) over LLMs for developing your writing skill?

As shown in Figure 15, when students were asked if they would prefer traditional learning methods, such as using model texts, receiving teacher instruction/feedback, and using dictionaries, over LLMs for developing their writing skill, the responses showed a division in preference. A proportion of 36.8% of students expressed a preference for traditional methods. In contrast, 25.3% of the respondents showed a preference for integrating LLMs into their writing practice.
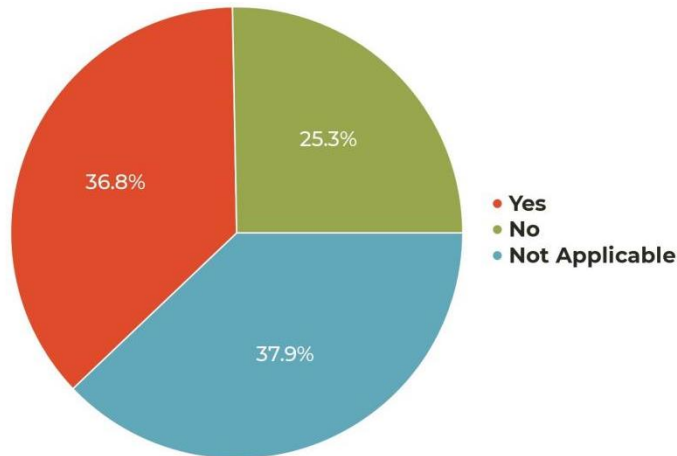
Figure 15. Student Preferences for Traditional Learning Methods vs. LLMs

Q22: How comfortable are you with the idea of using LLMs as a tool in learning English writing?

Figure 16 exhibits that when students were asked about their comfort level with using LLMs as tools for learning English writing, the responses varied, revealing a spectrum of comfort levels. A sample of 11.5% of students expressed being very comfortable with the idea, and 16.1% of respondents felt somewhat comfortable. The largest group, which is 24.1%, remained neutral, neither particularly comfortable nor uncomfortable with the concept. Also, 6.8% of students reported feeling somewhat uncomfortable. Lastly, 3.4% of students indicated they were very uncomfortable.
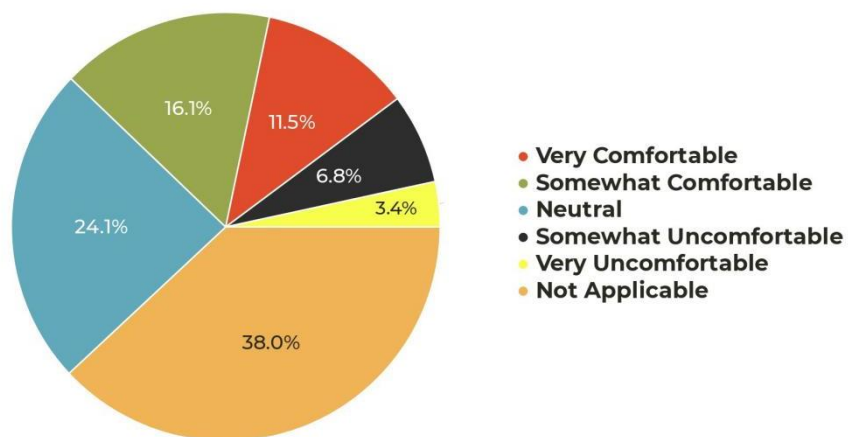
Figure 16. Students' Comfort Levels with Using LLMs in Developing Writing

Q23: In your opinion, should LLMs be integrated into regular language learning curricula of writing?

When asked about the potential integration of LLMs into regular language learning curricula for writing, student opinions varied. According to Figure 17, 21.8% of the respondents, supported the inclusion of LLMs. In contrast, 4.6% opposed such integration. The majority which was 35.6%, remained undecided, indicating a "maybe" stance.
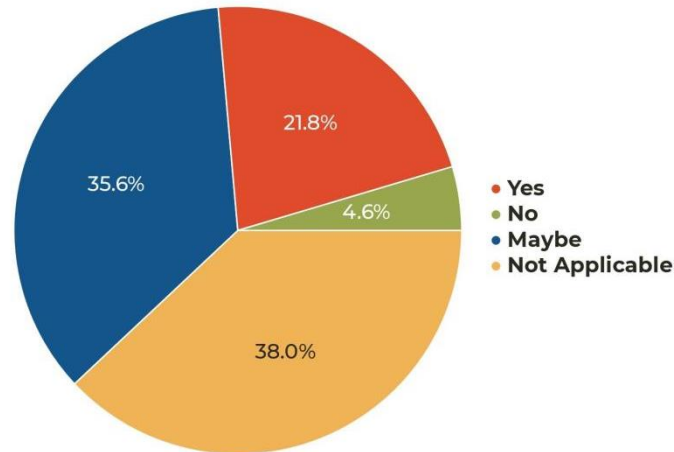
Figure 17. Students' Perspectives on Integrating LLMs into Writing Curricula

Q24: What concerns, if any, do you have about using LLMs in developing the writing skill?

When exploring concerns regarding the use of LLMs for writing skill development, participants selected from predefined options, resulting in a spectrum of apprehensions. As appears in Figure 18, dependence on technology emerged as the top concern, with 28.7% of students wary of becoming overly reliant on AI for writing tasks. This was closely followed by worries about the accuracy of the information, cited by 27.6% of students. The potential loss of traditional learning methods concerned 21.8% of respondents. Ethical concerns were selected by 18.4% of students. Only 2.2% indicated having no concerns, suggesting a high level of confidence in LLMs' role in writing development. The "Others" category, chosen by 5.7% of participants, included specific issues such as the impact of LLMs on creativity and critical thinking, concerns about originality, and potential negative effects on educational standards.
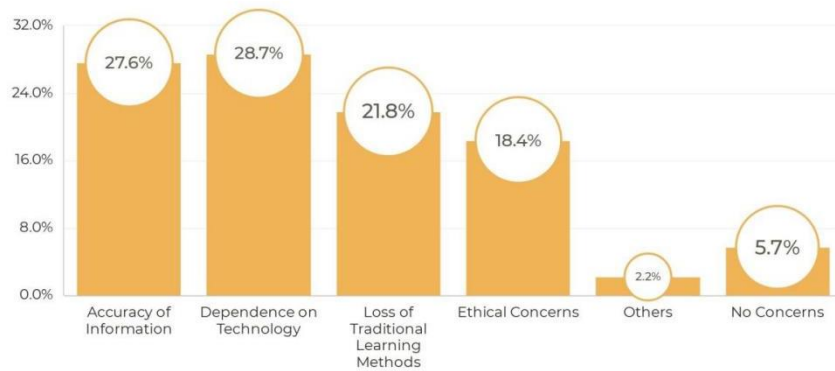
Figure 18. Students' Concerns Regarding the Use of LLMs in Writing

IV.6.1.4. Section Four: Additional Comments and Follow-up

In the fourth section of the questionnaire, participants were prompted to specify their preferred method of contact for potential follow-up engagements, such as online interviews, and were given the opportunity to provide any additional comments or suggestions regarding the research. While the specific responses to these questions are not directly analysed within the scope of this study due to their logistical nature and insignificance in answering the research questions, they play a crucial role in facilitating further qualitative research through interviews and gathering participant feedback on the research process. This section essentially serves as a bridge for deeper engagement with willing participants.

IV.6.2. Results of Students' Interviews

In this part, the results of the students' interviews are presented with a focus on their experiences and perceptions of the use of LLMs in the development of the writing skill.

Q1: Can you share a specific instance where using an LLM significantly impacted your writing process? What was the situation, and how did the LLM assist you?

The analysis of participants' experiences with LLMs in their writing tasks shows a wide range of outcomes. Table 2 shows that some participants, on the one hand, found LLMs very helpful, especially when they needed help organising their essays or crafting a detailed plan for their research proposals. For example, one participant mentioned that an LLM helped by providing a clear structure and examples for linking paragraphs, which made their essay flow better. On the other hand, some participants reported a more limited impact of LLMs on their writing. For instance, one person did not recall a specific situation where an LLM directly improved their writing but mentioned learning about punctuation. Another

participant reflected on a less successful experience, suggesting that relying too much on an LLM might not always lead to the best outcomes. This underlines the idea that while LLMs can support writing, their effectiveness largely depends on how individuals use them.

Table 2. Impact of LLMs on Writing Process of Participants

Participant	Specific Instance	Impact on Writing Process
1	Summarizing lectures and lessons	Enhanced retention of information during exams
2	Essay assignment aid	Highlighted the need for balanced technology use
3	Structuring an argument for a literature class essay	Improved essay structure and flow
4	Crafting a research proposal	Provided comprehensive insights and precise language
5	Understanding punctuation	Indirect benefit, no specific writing instance mentioned
6	Paraphrasing and idea generation	Supportive role in the writing process
7	Inserting a quote within a quote	Specific assistance in essay structuring

Q2: Have you faced any situation where an LLM's suggestion or output was not helpful or misleading? How did you handle that?

According to Table 3, it is clear there is a range of experiences and strategies when analysing how participants dealt with situations where the suggestions or outputs from LLMs were not helpful or misleading. Some participants encountered no problems, while others faced various challenges, including incomplete answers, outdated references, and responses that were off-topic or lacked focus. Despite these challenges, participants employed several effective strategies to overcome them. For instance, when faced with incomplete answers due to unclear prompts, participant 4 turned to additional research using search engines to fill in the gaps. Similarly, participant 3 encountering outdated references prompted

them to double-check LLM suggestions against current sources. Participant 4 noted the importance of asking precise questions to obtain accurate and relevant responses from LLMs. Participant 5 mentioned providing more detailed instructions or going back to their own notes when LLM outputs were unhelpful.

Table 3. Navigating LLM Challenges (Strategies and Insights)

Participant	Issue Faced	Strategy for Handling
1	None reported	Not applicable
2	Incomplete answers for unclear queries	Additional research to fill gaps
3	Outdated references	Verification with current sources
4	Lack of precision in queries	Emphasized clarity in framing questions
5	Misleading or off-topic answers	Provided detailed instructions and checked for errors
6	Repeated answers and loss of focus	N/A
7	Unhelpful outputs	Referred back to personal notes

Q3: In your opinion, what are the main advantages of integrating LLMs into the writing learning process?

The analysis of participants' views on the advantages of integrating LLMs into the writing learning process highlights several significant benefits. Primarily, the speed with which LLMs work and their capacity to introduce users to new writing skill concepts stand out as key advantages. This suggests that LLMs not only make the writing process faster but also serve as a platform for learning and experimenting with different writing styles and techniques. Furthermore, the ability of LLMs to generate coherent and accurate language and effectively sum-

marise content is particularly valued. Such features are instrumental in helping writers enhance the clarity and conciseness of their work.

Beyond practical improvements, LLMs are appreciated for providing instant feedback and a diverse array of examples and suggestions, likened by some participants to having a 24/7 writing tutor. This instantaneity accelerates the learning curve by offering immediate guidance. Additionally, LLMs' versatility in addressing specific learning goals and their ability to enrich the writing experience by fostering creativity and offering diverse perspectives underscore their transformative potential in writing education. From providing guidance when writers feel lost to enhancing organisational skills, LLMs emerge as multifaceted tools that, when thoughtfully integrated, can better the writing learning process.

Q4: Are there any disadvantages or concerns you have about relying on LLMs for learning and improving your writing skill? Please elaborate.

The responses to concerns about relying on LLMs for learning and improving the writing skill highlight a common theme of caution against overdependence. While participant 1 expresses no significant concerns, provided LLMs are used smartly and in moderation, others pinpoint potential risks that could emerge from heavy reliance. The most frequently mentioned disadvantage is the potential for LLMs to stifle personal creativity and critical thinking skills. Participants worry that depending on LLMs too heavily could lead to a decrease in their ability to think independently and creatively. Additionally, there is concern about the accuracy of LLMs, with some noting that these tools might not always grasp the context or nuances of a piece, which could result in misleading suggestions. The risk of plagiarism and the impact on academic integrity are also mentioned. Another concern raised is the effect of LLM use on the authenticity and improvement of writing over time. Participants fear that content generated by LLMs, despite being technically perfect, lacks the authenticity that comes from human creation, which could be less valuable from a learning perspective. There is also worry that reliance on AI for writing assistance might lead to a decline in the writing skill and critical thinking abilities, with participant 6 describing the potential to become "a slave for the AI." Furthermore, some are concerned that using LLMs might result in repetitive sentences and inaccurate information, negatively impacting the quality of their work.

Q5: How has your approach to planning, drafting, revising, and/or editing your writing changed since you started using LLMs?

The integration of LLMs into participants' writing processes has led to notable enhancements across various stages of writing, including planning, drafting,

revising, and editing as shown in Table 4. Participants reported a significant improvement in structuring their ideas more coherently and efficiently, with LLMs aiding in the organisation and coherence of drafts. Specifically, LLMs have been instrumental in outlining essays and other writing tasks. This has enabled writers to establish clear roadmaps for their work from the outset. Additionally, during the revising stage, the ability of LLMs to spot and suggest improvements for errors and mistakes has been highlighted as a major benefit. The editing process, too, has become notably more efficient, with LLMs cutting down on the time needed to refine and correct written pieces, thereby enhancing overall writing productivity. However, alongside these benefits, there is a note of caution regarding the potential for overreliance on LLMs, which could impact independent the writing skill and critical thinking. While LLMs have drastically reduced the time required for editing and revising, leading to significant efficiency gains, participant 6 expressed concerns about thinking less and procrastinating more on writing assignments.

Table 4. Impact of LLMs on Writing Process Stages

Stage of Writing	Impact of Using LLMs
Planning	More structured and effective outlining
Drafting	Enhanced coherence and content generation
Revising	Identified improvements, errors, and mistakes
Editing	Increased efficiency in refining drafts

Q6: Can you provide examples of any improvements in the grammar, vocabulary, spelling, and/or coherence of your writing since using LLMs?

Table 5 exhibits the feedback from participants on the improvements in their writing since using LLMs underscores a significant enhancement in various areas. Many noted a broadening of their vocabulary, attributing this expansion to their engagement with LLMs, which provided them with a wider array of word choices and helped them express complex ideas more clearly. This increase in vocabulary diversity has not only made their writing more engaging but also more

accurate. Alongside vocabulary improvements, participants also observed a better understanding of sentence structure and grammatical accuracy, leading to more coherent writing. The ability of LLMs to offer instant corrections and suggest contextually appropriate synonyms has been instrumental in these advancements. Moreover, several participants highlighted the role of LLMs in ensuring smoother transitions between ideas, thereby strengthening the overall coherence of their writing.

Despite these notable improvements, some participants mentioned the subtle and sometimes unconscious nature of these enhancements, indicating that the impact of LLMs on their writing skill might be more profound than immediately apparent. For instance, participant 5 noted the difficulty in pinpointing specific improvements, yet acknowledged a significant impact on coherence and a widening of vocabulary to include technical terms. Participant 7 mentioned an improvement in paraphrasing skill as a direct benefit of interacting with LLMs.

Table 5. Improvements in Writing Due to LLM Use

Area of Improvement	Description
Vocabulary	Broadened range of vocabulary, including technical terms, enhancing clarity and expressiveness.
Grammar	Improved understanding of grammatical structures, leading to more accurate writing.
Coherence	Strengthened coherence and smoother transitions between ideas.
Paraphrasing Skill	Enhanced ability to paraphrase, thus contributing to more diverse expression.

Q7: Would you recommend LLMs to other learners for writing assistance? Why or why not?

The responses to whether participants would recommend LLMs for writing assistance reveal a spectrum of opinions, influenced by personal experiences and observations of others' use of the technology. A common thread among the proponents of LLMs is the acknowledgment of their utility in enhancing various aspects of writing, such as idea generation, vocabulary expansion, and structural organisation. For instance, participant 1 expressed a straightforward endorsement, believing that "LLM helped me in my experience, and I think it is good for everyone with no exceptions," highlighting a positive personal experience with LLMs that they feel could be universally beneficial. Others, while supportive of LLMs, recommend them with reservations, emphasising the importance of using these tools judiciously. They advocate for LLMs as supplementary aids that can offer "constructive feedback" and "assist in structuring and organising ideas," but caution against relying on them to the extent that it hampers the development of personal skills and creativity.

Conversely, some participants express more nuanced or outright sceptical views on the advisability of using LLMs for writing assistance. The conditional recommendation, suggesting that LLMs could be beneficial depending on "the individual's needs and writing goals," reflects a perception of LLMs as tools whose value varies by user. This perspective underscores the importance of critical engagement with LLM output and a balanced integration of technology in learning processes. There are concerns about the potential for LLMs to foster overreliance, with participant 7 wary of recommending them, especially to beginners, for fear that it might inhibit the development of the writing skill. The critique is that some learners might use LLMs for mere "copy-and-paste" activities, thus stunting their writing skill development.

Q8: What has been the most important lesson or insight you have gained throughout your journey with using LLMs to develop your writing skill?

Throughout the journey of incorporating LLMs into the writing process, participants have gleaned a variety of important lessons and insights, all of which underline the nuanced relationship between technology and human creativity. A common theme among the responses is the recognition of LLMs as sophisticated tools that, when used appropriately, can enhance the writing skill without supplanting the essential elements of effective writing practices. One participant eloquently captures this sentiment, noting the "importance of a relationship between technology and traditional writing," which emphasises that LLMs should complement rather than replace foundational writing techniques.

Furthermore, there is a strong acknowledgment of the need for balance and critical engagement with the outputs of LLMs. The insights range from ap-

preciating the role of technology in facilitating growth and learning to cautioning against overreliance on LLMs to the detriment of originality and personal development. The idea that "originality comes from the person, not a machine" denotes the value placed on human creativity and the irreplaceable nature of human-generated content. Participants also highlight the importance of persistence, experimentation, and continuous learning as keys to leveraging LLMs effectively.

Q9: Is there anything you wish LLMs could do better to assist in the writing process?

Participants shared various wishes for improvements in LLMs that could make them more effective in assisting the writing process. A common desire is for LLMs to diversify their sentence structures, as participant 1 noticed a tendency for these models to repeat the same patterns, which can limit the creativity and dynamism of written content. Additionally, there is a strong call for more personalised feedback from LLMs, with participant 2 hoping for enhancements that tailor suggestions more closely to individual writing styles, objectives, and learning goals. This kind of customisation would allow LLMs to offer more relevant and useful advice.

Additionally, participant 4 expressed a desire for LLMs to better understand and adapt to the context and tone of their writing, noting that LLMs sometimes miss the intended style or voice. Improving LLMs' capability to recognise and correct complex grammatical issues was also mentioned as a way to boost their utility in refining writing quality. Some frustrations were voiced by participant 6 about LLMs changing the original direction of prompts or requests, leading to outputs that deviate from users' intentions. Reducing unnecessary repetition and ensuring that LLMs respond more accurately to specific requests were other improvements users hoped to see. Lastly, a call for neutrality in LLMs' outputs suggests a need for technology that supports logical and unbiased writing.

IV.6.3. Results of Teachers' Interviews

In this part, the results of the teachers' interviews are presented with a focus on their awareness, use, and perceptions of the use of LLMs in the teaching of the writing skill.

IV.6.3.1. Section One: Awareness
Q1: Where have you first encountered information or discussions about LLMs in the context of language teaching and learning?

The responses about how teachers first learned about LLMs for language teaching show that there are many ways to find out about new teaching tools.

Teachers learn about these tools in both planned and unplanned ways, from formal workshops to casual observations of their students. For example, some teachers discovered ChatGPT at professional workshops or academic events (participant 1, participant 2), showing that these organised settings play a key role in introducing teachers to new technologies. This highlights the value of attending such events to stay updated with the latest teaching tools.

On the other hand, stories about learning from students or seeing students use ChatGPT during class point out that learning can happen unexpectedly and that students can also teach their teachers about new technologies. This shows the learning process is a two-way street and that real classroom experiences are important for discovering useful tools. Similarly, finding out about ChatGPT through social media or a colleague's video, as stated by participant 5, illustrates how informal connections and online platforms are also valuable for learning about and sharing information on innovative teaching methods.

IV.6.3.2. Section Two: Use
Q2: When did you first start using LLMs in your teaching, specifically for developing the writing skill? What motivated this decision?

In late 2023, shortly after the launch of ChatGPT 3.5, Participant 1 began integrating LLMs into their teaching practice, motivated by the goals of enhancing interactivity in the learning process and personalising feedback for students' writing assignments. Conversely, participants 2 and 3 exhibit a more cautious engagement with LLMs. Participant 2 specifically mentions using LLMs primarily for proofreading purposes, suggesting a targeted yet limited application of this technology in their teaching practice.

Meanwhile, participant 3, although not directly using LLMs in teaching, actively promotes awareness among students about the significance of these tools, acknowledging their value without incorporating them into direct instructional strategies. On the other hand, participants 4 and 5 describe a more organic adoption of LLMs, with participant 4 integrating them during an academic writing lesson and participant 5 gradually increasing their use in teaching the writing skill as their familiarity and skill with the technology grew.

Q3: Which LLMs have you used, or are you currently using, in your teaching practice?

Across the responses, teachers reveal a preference for ChatGPT as their primary tool within the realm of LLMs for enhancing their teaching practices. Participant 1 emphasises the versatility of ChatGPT 3.5, noting its utility in generating engaging content, creating dynamic writing prompts, and facilitating a

platform for conversational English practice. Participants 2, 3, and 4 also express their usage of ChatGPT, with Participant 2 additionally mentioning Deepl Write.

Participant 5 expands the list even further by introducing the use of Google's Bard, Elicit, and others, though they specifically highlight the transition from ChatGPT 3.5 to the paid version, ChatGPT 4, as a significant upgrade in their teaching arsenal. According to Participant 5, despite the higher cost, ChatGPT 4 stands out as the superior choice due to its enhanced capabilities, indicating a willingness to invest in advanced tools that offer tangible benefits to teaching and learning processes.

Q4: Can you describe how you integrate LLMs into your writing instruction? Please mention specific examples or activities.

Teachers creatively integrate LLMs into their writing instruction, showcasing a spectrum of uses tailored to enhance both the teaching and learning experience. For example, participant 1 uses ChatGPT to generate engaging writing prompts, a method that injects creativity and context into writing assignments, thus encouraging students to craft short stories from uniquely designed prompts. Similarly, participant 4 describes a structured application of ChatGPT in classroom activities, including transforming non-academic paragraphs into academic ones and using the tool in vocabulary enhancement games.

On the other hand, some educators, like Participant 2, turn to ChatGPT for inspiration and to diversify teaching methods, using it as a resource for fresh ideas to break away from routine instructional practices. Participant 3, meanwhile, advocates for a more student-directed approach, encouraging learners to use LLMs for tasks such as spell checking and improving their writing, thereby emphasising independence and self-improvement. Participant 5's use of LLMs for creating sample content and providing feedback illustrates another dimension of LLM integration, where the technology serves both as a teaching aid for illustrating writing principles and a tool for facilitating the feedback process.
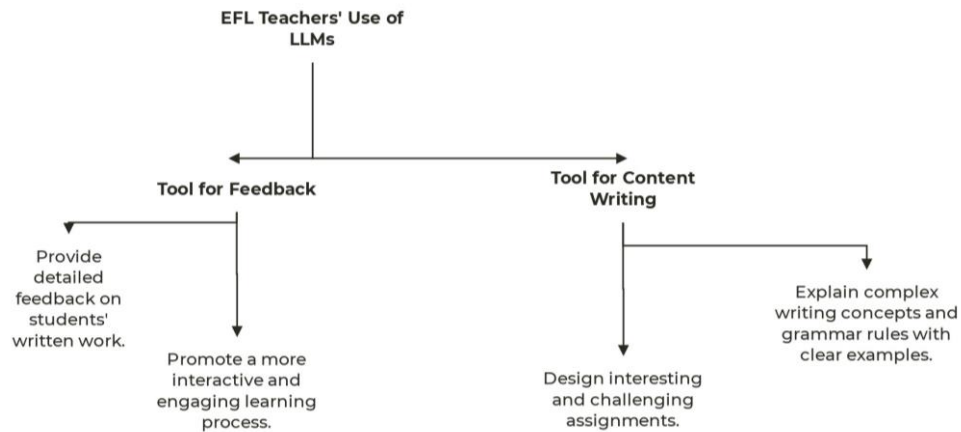
Figure 19. Teachers' Use of LLMs in Teaching the Writing Skill

Q5: How do you balance the use of LLMs with traditional teaching methods in developing the writing skill? Which of the options do you mostly use? Why?

Educators navigate the integration of LLMs with traditional teaching methods in various ways, aiming to balance the innovative with the conventional to enhance writing skill development. Participant 1 describes a thoughtful, blended approach where traditional methods are employed for teaching the writing skill such as grammar rules and thesis statement development. For them, LLMs play a crucial role in enhancing creativity and supporting the drafting and revising stages of writing.

In contrast, Participants 2 and 4 express a preference for traditional teaching methods, using LLMs more sparingly. Participant 2 relies on traditional teaching for its proven validity and occasionally incorporates AI tools for generating ideas. Similarly, Participant 4 allows limited use of LLMs during sessions in order that they maintain a predominantly traditional classroom environment due to a lack of complete trust in LLMs compared to proven traditional methods. Meanwhile, participant 3 focuses on using LLMs for specific exercises like word checks while aiming to prevent dependency on technology. Participant 5 strives for a balance and recognises the benefits of integrating technologies like LLMs into the classroom without specifying the extent to which they rely on one method over the other.

Q6: In your opinion, which approach to teaching English writing (process, product, and genre) and in which stage of it can be included in LLMs?

The integration of LLMs has sparked diverse insights among teachers regarding their application across different approaches to teaching writing. Educa-

tors, notably participants 1 and 4, have underscored the versatility of LLMs, particularly valuing their contribution to the process approach in writing instruction. This approach, as outlined by participant 4, positions LLMs as instrumental in guiding students through the iterative phases of writing, from initial ideation to the editing stage. The capacity of LLMs to facilitate a detailed exploration of various writing genres also received acknowledgment.

Concerning the product approach, participant 2's perspective introduces a critical note, questioning the ability of LLMs to fully comprehend and teach the nuanced aspects of human language and creativity. This scepticism highlights an important consideration in the deployment of LLMs for writing instruction. Despite this, the general consensus among teachers, including participants 1 and 5, leans towards a positive evaluation of LLMs' potential to enrich writing pedagogy. As participant 5 suggests, "ChatGPT's extensive knowledge base can accommodate various approaches, provided the prompts are carefully crafted."

Q7: Have you encountered any pedagogical challenges in integrating LLMs into your teaching? How have you addressed them?

Teachers of writing at Algerian universities have shared varied experiences regarding the pedagogical challenges of integrating LLMs into their teaching, particularly in the domain of writing instruction. Participant 1 highlighted the concern of students potentially becoming overly reliant on LLMs, which could detract from the critical thinking essential to writing. To combat this, they have emphasised the importance of using LLMs to augment rather than replace traditional teaching methods.

Conversely, other educators have reported differing degrees of challenges, from minimal to more significant issues. For instance, Participant 4 notes challenges related to device usage in class, leading to distractions and the unoriginal use of LLM outputs by students. They express frustration over students copying from LLMs verbatim. On a different note, Participant 5 points out logistical challenges, such as the financial burden of maintaining LLM subscriptions and dealing with occasional technical downtime.

Q8: Do you use LLMs to facilitate feedback on and assessment of students' written work? How?

Teachers reveal diverse approaches and perspectives on employing LLMs for providing feedback and assessing students' written work. Participant 1 describes an innovative use of LLMs, particularly in the early stages of the writing process. By using ChatGPT for preliminary feedback on grammar and structure, they enable students to refine their drafts more efficiently before undergoing the

more nuanced evaluation that requires the educator's expertise. Conversely, other educators express caution towards integrating LLMs into their feedback and assessment procedures.

Participants 2 and 3 indicate a hesitancy or lack of current engagement with LLMs for evaluative purposes, though Participant 2 is open to future exploration. Participant 4 emphasises a reliance on personal expertise over LLMs for assessing student work. Participant 5, however, shares a notably positive experience with using LLMs for feedback and assessment by describing the tools' capability to identify not just surface errors but also deeper issues of coherence and organisation in student writing.

Q9: Based on your experience, how do you see the role of LLMs in teaching the writing skill evolving in the future?

Teachers share a range of predictions about the evolving role of LLMs in teaching the writing skill. Participant 1 envisions a future where LLMs become central to the writing curriculum, praising their ability to offer immediate, personalised feedback and anticipating their potential to create a more interactive learning environment. They foresee LLMs providing deeper insights into writing processes and techniques while suggesting that future iterations could simulate peer-review processes and offer critiques on style and voice, thereby enriching the educational experience.

Participants 2 and 3 advocate for a pragmatic approach to LLM integration through emphasising the importance of embracing technological advancements in pedagogy while being mindful of their limitations. Participant 2 is open to integrating ICT-based pedagogical tools, including LLMs; they recognise their potential despite acknowledging drawbacks. Similarly, Participant 3 calls for a focus on educating students on the effective use of LLMs rather than restricting their use, while suggesting that proper guidance could mitigate misuse and consolidate the productive relationship with the technology.

Participant 4 referred to the conditional utility of LLMs. They note that their effectiveness hinges on students' ability to use them properly and appropriately. Also, they suggest that, when used appropriately, LLMs can significantly enhance students' English language proficiency and writing skill, but improper use could lead to detrimental effects on their learning journey. Participant 5 indicates that they anticipate a very promising future when it comes to using LLMs in teaching writing skill, expressing their excitement for coming updates, new features, and LLMs coming in the future.

Section Three: Perceptions

Q10: How do you perceive the potential impact of LLMs on students' writing proficiency and learning outcomes? Which aspect/aspects of writing (grammar, spelling, vocabulary, and/or coherence) do they impact the most?

Teachers have varied perspectives on how LLMs influence students' ability to write and their overall learning. Participant 1 sees clear advantages, especially in helping students use a wider range of words and organise their writing better. They emphasise that LLMs quickly improve spelling and grammar, but the bigger benefit is how they help students think more deeply about what they want to say and how to say it clearly.

In contrast, participants 2 and 5 express concerns about the potential for misuse of LLMs by students, particularly the temptation to copy and paste content generated by LLMs without engaging in the learning process. Participant 2 critiques the reliance on AI tools as promoting laziness, which could negatively impact the development of essential language skill such as spelling, grammar, and vocabulary. Participant 5, in the same vein, warns that improper use of LLMs could significantly hinder the learning process. However, Participant 5 also acknowledges the potential for LLMs to positively develop various writing aspects, particularly vocabulary and punctuation, if used appropriately.

Participants 3 and 4 believe that LLMs mainly help with spelling and expanding vocabulary. They think these tools have a direct, noticeable impact on these areas of writing. The anticipation of a "huge" impact on writing proficiency and learning outcomes by participant 3 denotes a general optimism about the role of LLMs in education, albeit without dismissing the challenges that come with integrating these technologies into teaching practices.

Q11: Do you believe that LLMs can address any specific challenges or limitations in teaching writing skill? If so, which ones?

Teachers at Algerian universities see the value of using LLMs in teaching writing, though their opinions differ on how these tools can help overcome teaching challenges. Participant 1 is convinced that LLMs can help with the challenge of giving personalised feedback in large classes, a common issue in writing instruction. This participant also mentions that LLMs are great for making writing more interesting for students by providing creative prompts. Additionally, Participant 2 does not point out any specific challenges that LLMs might solve.

Meanwhile, Participant 3 believes that LLMs can boost students' motivation by offering content that catches their interest, which is critical for learning. This aligns with research suggesting that engagement is key to learning success (Hidi & Boscolo, 2006). Participants 4 and 5 note that LLMs can make writing

topics more relevant to students. Participant 4 values how LLMs always offer fresh ideas, helping teachers keep lessons interesting. Participant 5 uses LLMs to move beyond outdated textbooks, creating content that speaks to students' current interests, such as sports or celebrities, making learning more relatable.

Q12: Do you think that students writing attitudes would change with the incorporation of LLMs into teaching writing?

Upon asking them about the changes in students' writing attitudes following the integration of LLMs into their teaching, teachers have observed varying impacts. Participant 1 reports a positive shift, noting that writing has transformed from a mandatory task into a more engaging and creative activity for students. This change is attributed to the interactive nature of LLMs, which provide instant feedback and open up new avenues for creative expression, thus making writing a more appealing and less daunting process.

The potential for attitude changes, according to Participant 2, hinges on the wise use of LLMs within the teaching framework. This suggests that the effectiveness of LLMs in altering students' writing attitudes may be contingent upon the educators' ability to integrate these technologies thoughtfully and purposefully into their pedagogy. Similarly, Participant 3 emphasises that the impact on student attitudes depends significantly on the method of LLM incorporation, indicating that the outcome is not a given but varies based on implementation strategy.

Moreover, Participant 4 has observed an increase in student participation and engagement, particularly among those who previously were less likely to contribute. The introduction of LLMs seems to have democratised the idea generation process, albeit with the fact that some ideas may not be originally theirs. Conversely, Participant 5 expresses concern that some students may become overly reliant on LLMs, resorting to technology at the first sign of difficulty instead of persevering through challenges independently. This reliance could potentially hinder the development of critical problem-solving and creative thinking skills.

Q13: How can we address concerns about plagiarism or over-reliance on LLMs in student writing?

Addressing the concerns of plagiarism and over-reliance on LLMs in student writing requires a multifaceted approach, as highlighted by teachers. Participant 1 suggests that educating students on the ethical use of technology forms the cornerstone of this strategy. By incorporating discussions and guidelines on responsible LLM usage, educators aim to reinforce the notion that LLMs should

enhance rather than supplant the intellectual rigour and creativity inherent in the writing process. Additionally, the integration of plagiarism detection software and the emphasis on developing critical thinking skills are seen by participant 2 as vital steps in helping students recognise the importance of originality.

Participant 2 advocates for institutional measures, recommending that universities invest in advanced plagiarism detection tools capable of identifying content generated by LLMs. Similarly, Participants 3 and 4 emphasise the importance of framing LLMs as assistive tools rather than replacements for student effort. By educating students on the appropriate use of LLMs and raising awareness about the potential pitfalls of over-reliance, educators hope to guide students towards more responsible and effective use of these technologies.

Participant 5 introduces a nuanced perspective on the issue, arguing that the unique output style of LLMs may mitigate traditional concerns about textual plagiarism but raises the issue of ghostwriting. The suggested solution, akin to others, revolves around enhancing awareness among students and researchers about the importance of maintaining academic integrity and the potential academic and ethical consequences of misuse.

Q14: Can LLMs offer personalised feedback to students regarding their writing performance? Please explain your viewpoint in detail.

Writing teachers have different opinions on how well LLMs can give personalised feedback to students about their writing. Participant 1 agrees that LLMs can provide some level of personalised feedback, useful for spotting grammar mistakes, suggesting how to structure sentences better, and offering different word options. However, this participant also points out that LLMs fall short of fully grasping each student's individual learning process and specific difficulties.

On a more optimistic note, participants 2, 3, and 4 are more hopeful about LLMs' ability to improve the feedback process. Especially Participant 2 suggests a mix of feedback from both AI and teachers that could provide a well-rounded view of students' writing while catching details teachers might miss.

Participant 5 offers an innovative view, suggesting LLMs could be used in a way that mimics the interaction students have with their teachers, proposing this setup as a new area for academic exploration. This perspective suggests a belief in the potential for LLMs to change how writing is taught, especially by giving feedback that helps students grow.

Q15: Would you be interested in training sessions focused on utilising LLMs for teaching EFL, particularly for developing the writing skill? Why or why not?

Teachers show a strong and shared interest in training sessions that focus on using LLMs for teaching the writing skill. Participant 1 shows a strong interest in these sessions, believing that learning more about effective methods and new ways to use these tools is crucial for getting the most out of LLMs in writing teaching. Similarly, Participant 2 is open to any training that could improve teaching methods, emphasising a willingness to use ICT in education.

Participants 3 and 4 also show interest in LLM training sessions. Participant 3 sees LLMs as helpful tools in teaching, while Participant 4, though interested, mentions worrying about the training being dull but also talks about the importance of how the training is presented and structured. Participant 5 has a distinct perspective, having already taken part in such professional development activities. This educator's active pursuit of knowledge in AI and language teaching shows a dedication to using technology to improve education.

IV.7. Recapitulation

The research on the awareness, use, and perceptions of LLMs among Algerian EFL university teachers and learners demonstrates a universal recognition and active use of technologies like ChatGPT to aid in English writing development. Students acknowledged the advantages of LLMs, particularly noting enhancements in vocabulary, grammar, and overall writing proficiency. This widespread awareness and positive perception towards LLMs reflect their role in language learning, which also denotes the potential of these tools to significantly support and enhance the writing skill of EFL learners.

Algerian EFL university learners are using LLMs extensively in their writing development process, as shown by the analysis of the questionnaire and interview. Students use LLMs for a wide range of writing tasks, including essay writing, paraphrasing, summarising, and draft editing. This indicates that LLMs are integrated throughout the various stages of writing, from planning and organising ideas to refining the final piece. While academic writing is the primary area of LLM application, students also apply these tools to personal, creative, and technical writing, highlighting the versatility of LLMs in catering to different writing needs.

Furthermore, the interviews reveal that students value LLMs for their immediate feedback and suggestions, which significantly aid in vocabulary enhancement, grammar improvement, and the achievement of clarity and coherence in their texts. This way of using LLMs not only supports the technical aspects of writing but also establishes greater competence in the language. This demon-

strates the essential role of LLMs in the holistic development of the writing skill among Algerian EFL university learners.

The perceptions of Algerian EFL university learners regarding the effectiveness of LLMs in developing the writing skill are broadly positive but accompanied by an understanding of potential limitations. Students have reported appreciable improvements in vocabulary, grammar, structure, and coherence in their writing as a result of using LLMs. The immediate feedback and variety of writing suggestions that LLMs offer have been highlighted as key benefits, as they enable learners to refine their writing skill actively and explore new writing styles and techniques.

However, alongside recognising these benefits, students have also expressed concerns about the potential over-reliance on LLMs. There is an awareness among learners about the importance of maintaining a balance between using LLMs and engaging in traditional learning methods. Concerns include the fear that excessive dependency on LLMs might hinder the development of critical thinking and independent writing capabilities, along with creativity. Additionally, some students worry about the accuracy and reliability of the content generated by LLMs, thus indicating a cautious approach towards integrating these tools into their learning process. This reflects a mature perspective among learners for valuing LLMs as beneficial tools while recognising the need for engagement and balance in their use for educational purposes.

The awareness of LLMs like ChatGPT among Algerian EFL university writing teachers reveals that only a specific subset of educators are familiar with and actively use these technologies in writing instruction. This awareness mostly comes from their involvement in special training sessions, online forums about teaching with technology, and working together with other educators. Despite the clear benefits these tools can offer for teaching writing, their use is not widespread among all teachers, which points to a gap between what these technologies could do and how much they are currently used. This scenario emphasises the need for more efforts in information dissemination and training on LLMs to encourage adoption and maximise their impact on language teaching and learning.

Based on the analysis of interviews with Algerian EFL university teachers, LLMs are being used in several ways to enhance the writing skill of students. Teachers are incorporating LLMs primarily as a supplemental tool to provide feedback on students' written work, which allows for a more interactive learning process. Using LLMs, teachers can create interesting writing assignments, help students improve their drafts, and provide clear examples to explain complex writing concepts or grammar rules. This approach not only helps in improving

students' grammar and vocabulary but also in developing their ability to write arguments and narratives more effectively.

Furthermore, some teachers use LLMs to introduce students to a variety of writing styles and genres, which develops their knowledge and keenness for various writing styles and genres. This exposure is useful in encouraging students to experiment with their writing to enhance creativity and confidence in their language abilities. Through the integration of LLMs into the curriculum, teachers aim to create a more engaging and supportive environment for writing development. This denotes the benefits of these tools in introducing an interesting approach to learning the writing skill.

Algerian EFL university teachers' perceptions concerning the effectiveness and integration of LLMs in developing the writing skill are overall positive. They acknowledge the high potential of these tools to enhance students' writing. From the analysis of interviews, teachers view LLMs as a useful addition to their teaching arsenal, particularly for providing personalised feedback, which is seen crucial for the process of writing development. They stress the ability of LLMs to offer a wide range of examples, stimulate creative thinking, and expose students to ample writing styles, techniques, and genres.

However, alongside the recognition of their benefits, there is also a cautious approach towards their integration. Teachers emphasise the importance of balancing the use of LLMs with traditional teaching methods to ensure the development of the writing skill. Concerns were raised about students potentially becoming too reliant on LLMs, which could impact their ability to develop independent writing and the critical thinking skill. Teachers advocate for the incorporation of LLMs into the curricula of writing. This suggests that while LLMs can assist the writing process, they should complement rather than replace conventional learning and teaching practices. This perspective reveals an understanding of the role of LLMs in developing the writing skill while emphasising the need for careful and thoughtful integration.
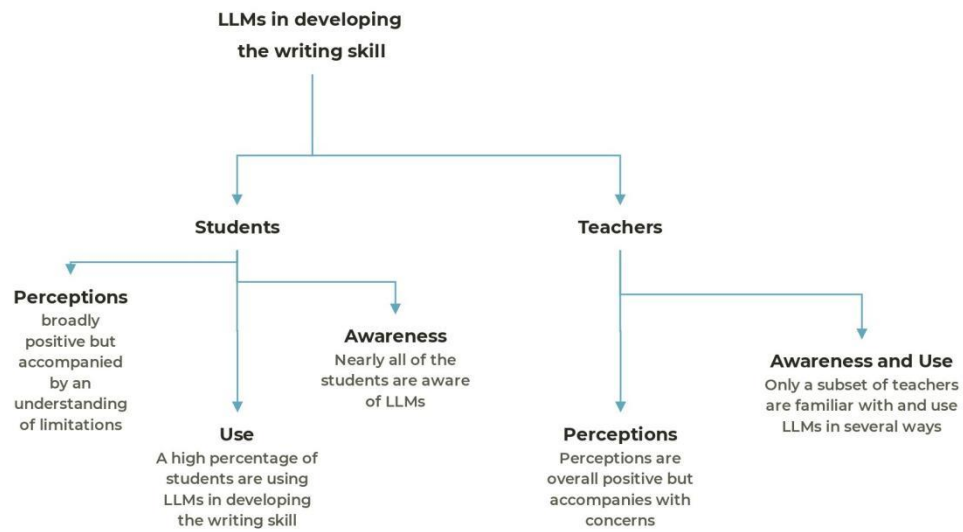
Figure 20. Recaputation of the Study

Conclusion

Concluding this chapter, the exploration of the awareness, use, and perceptions of LLMs among Algerian EFL university teachers and learners in developing the writing skill provides important insights into the integration of technology in language teaching. While teachers exhibit a varied awareness and application of LLMs, there is a shared acknowledgment of their potential to significantly enhance writing instruction. Both educators and learners recognise the benefits of LLMs in improving the writing skill, from grammar and vocabulary to coherence. However, the discourse also sheds light on concerns about over-reliance on technology and the importance of maintaining a balance with traditional teaching methods. This chapter asserts the need for targeted professional development and a strategic approach to integrating LLMs into the writing curricula in order to ensure that technology serves as a complement to, rather than a replacement for, conventional educational practices.

General Conclusion

This study focused on exploring the awareness, use, and perceptions of university teachers and students of LLMs in developing EFL learners' writing skill. The study was conducted using a mixed-methods approach, combining quantitative data from participant questionnaires with qualitative insights gathered through interviews. The results indicated that LLMs provide benefits in enhancing the writing skill. Most significantly, they offer personalised feedback, simulate various writing scenarios, and create an engaging learning environment. Both teachers and learners reported positive experiences with LLMs and stressed their effectiveness in complementing traditional teaching methods.

The findings reveal a difference between student and teacher perceptions regarding the use of LLMs in developing the writing skill . Students largely favour the use of LLMs, as they noted enhancements in the writing skill and an engaging learning experience. They appreciate the personalised feedback and variety of writing scenarios that LLMs provide. In contrast, teachers acknowledge the benefits but express concerns about students becoming overly dependent on technology. They emphasise the need for a balanced approach that includes traditional teaching methods to ensure students develop critical thinking and independent writing skill.

This research is prompted by the rapid advancements in the field of AI and the specific contributions of LLMs like ChatGPT in educational domains. Aiming to address the gap in existing literature regarding the application and efficacy of LLMs in EFL writing instruction, the study sets out with clearly defined objectives and research questions. These inquiries are geared towards understanding the role of LLMs in supporting EFL learners' writing enhancements and elucidating both educators' and students' perceptions of integrating LLMs into TEFL practices. By creating a theoretical framework and doing a thorough review of the literature, the study shows that there is a notable lack of empirical research on how LLMs can be used in the real world to help EFL students improve their writing skill.

The principal contribution of this dissertation lies in its exploration of the use and efficacy of LLMs in the realm of TEFL, specifically focusing on enhancing the writing skill among EFL learners. This study not only addresses but also begins to fill a significant gap identified in the existing literature concerning the practical application and impacts of LLMs on the development of the writing skill. By concentrating on LLMs, the research presents novel data on how these advanced AI technologies can be integrated to support and improve TEFL.

This research makes a critical contribution by demonstrating how LLMs can solve several enduring problems in TEFL, particularly writing instruction.

The study revisits the problem statement outlined at the outset by providing concrete evidence of LLMs' potential to enhance writing proficiency through personalised feedback mechanisms and the generation of diverse writing prompts that cater to the varied needs of learners. Through methodical examination and analysis, the dissertation offers a comprehensive understanding of LLMs' role in creating more engaging, responsive, and effective EFL writing instruction environments.

This research significantly contributes to the academic discourse by addressing the previously identified knowledge gap, referring back to the literature review. It critically evaluates the current state of AI applications in TEFL, highlighting the underexplored area of LLMs, and then systematically investigates this niche. The findings from this study not only confirm some of the hypothesised benefits of LLMs, such as improved engagement and writing quality, but also challenge existing assumptions about the applicability and effectiveness of AI in language learning settings. By doing so, it enriches the body of knowledge with new empirical evidence and theoretical insights and sets a precedent for future studies in this burgeoning field.

Limitations of the Study

This research is not without limitations and problems. The primary limitation of this research lies in the potential constraints of the sample size and scope, which may limit the generalizability of the findings. Another limitation could be the reliance on self-reported data in surveys, which might introduce response bias. Another limitation this study faces is the scarcity of prior research on LLMs in TEFL, impacting the depth of the theoretical foundation and analysis. These limitations could impact the depth and breadth of the study's findings.

Recommendations

Based on the findings of this research on the use of LLMs for writing skill enhancement, the following recommendations for further study are proposed:

- Future research should investigate the application and impact of a wider variety of LLMs in TEFL. Given the rapid development of AI, studies examining newer or less common LLMs could provide insights into their potential benefits and limitations in language learning environments.

- There is a need for longitudinal research to assess the long-term effects of LLM integration in EFL writing instruction. Such studies could help determine whether improvements in the writing skill are sustained over time and how LLM use influences other aspects of language proficiency.

- Using an experimental design, comparative studies between LLMs and other AI tools or traditional teaching methods could elucidate the specific advantages or disadvantages of LLMs in enhancing EFL the writing skill. This research could guide educators in selecting the most effective tools for their teaching contexts.

- Investigating how teachers adapt their instructional strategies to incorporate LLMs into their teaching could offer deeper insights into the pedagogical implications of these technologies. Studies could explore the training needs of teachers and the challenges they face in integrating LLMs into their curriculum.

Based on the findings of this study, several recommendations for teachers and students can be made to effectively harness the potential of LLMs in developing the writing skill:

For Teachers:

- Teachers can integrate LLMs as a tool for brainstorming and generating ideas for writing assignments. By prompting students to interact with LLMs, teachers can encourage creativity and help students overcome writer's block.

- LLMs can provide instant, personalised feedback on students' writing by identifying areas for improvement such as grammar, punctuation, and style. Teachers should instruct students on how to interpret and act on this feedback to improve their writing skill.

- Teachers can encourage students to critically evaluate the suggestions and content generated by LLMs. This includes assessing the accuracy, relevance, and appropriateness of the language and information provided by the models.

- Teachers can take advantage of the adaptability of LLMs to create customised writing exercises that cater to the specific needs and proficiency levels of students; examples of such exercises and activities written with LLMs are presented in Appendix 4. Teachers can design prompts that target particular language skills or thematic areas.

- Teachers can benefit from training programmes that enhance their understanding of LLMs' capabilities in writing instruction, which aim to increase awareness about how to integrate LLMs with traditional teaching methods effectively, address potential overreliance on technology, and provide strategies for maintaining educational standards.

For Students:

● Students can actively engage with LLMs by experimenting with different prompts and observing the variety of responses generated. This can inspire new ideas and perspectives for their writing.

● Students can use LLMs as a practice tool to write more frequently. The instant feedback provided by LLMs can be particularly useful for self-directed learning and continuous improvement.

● Students can pay attention to the vocabulary and grammatical structures suggested by LLMs. Students can learn new words and grammar rules by analysing the language used by the models in their responses.

● Students can use the feedback from LLMs to develop editing skills. By revising texts based on LLM suggestions, students can learn to identify and correct their own writing errors.
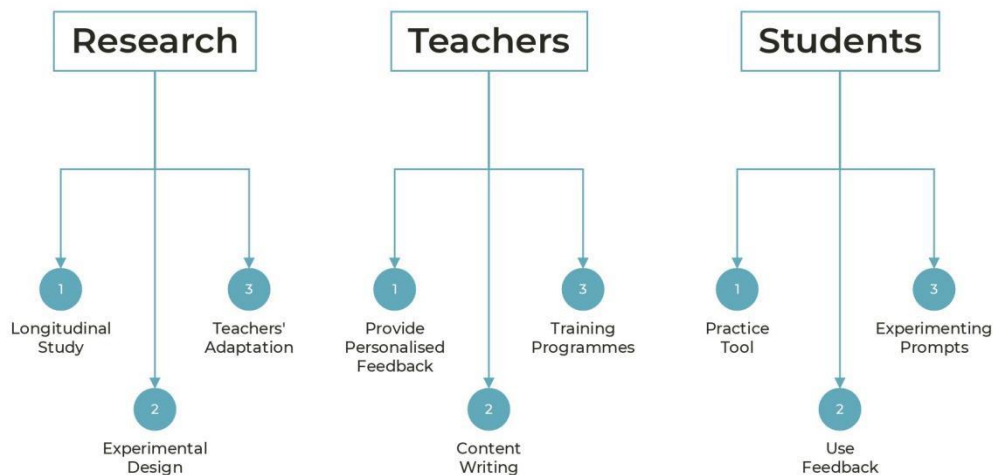
Figure 21. Recommendations of the Study

On the whole, this study demonstrates the critical role of LLMs in improving the writing skill for EFL learners. It examines both the benefits and disadvantages of using LLMs in writing instruction. The study provides clear evidence that LLMs can help improve writing, but it also shows the need to use them carefully alongside traditional teaching methods. This research is valuable for teachers and policymakers because it offers insights on how to use new technologies to achieve better educational results.

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Appendices

Appendix 1: Students' Questionnaire

LLMs for developing the Writing Skill

Welcome and thank you for participating in this research study. Your insights, perspectives, and opinions are valuable in understanding the use of Arti cial Intelligence Large Language Models (LLMs), including ChatGPT-3.5, ChatGPT-4, Google Bard, and others, in developing English writing skills among university students. This questionnaire is designed to gather your perspectives and experiences. Your responses will be kept con dential and used solely for academic research purposes.

General Instructions:

- Please answer all questions honestly and to the best of your ability.
- There are no right or wrong answers; we are interested in your personal opinions and experiences.
- If you are unsure about a question, please give your best estimate or select the option that most closely refl ects your opinion.
- Take your time to read and understand each question before responding.

1. Email *

2. Gender *

Mark only one oval.

⬭ Male

⬭ Female

3.   Age*

   Mark only one oval.

   ⬭ 18-24

   ⬭ 25-36

   ⬭ 37-45

   ⬭ 46+

4.   Current Year of Study*

   Mark only one oval.

   ⬭ 1st year Licence

   ⬭ 2nd year Licence

   ⬭ 3rd year Licence

   ⬭ Other: _____

5.   Have you ever used any Artificial Intelligence tools for educational or personal   *
   purposes? If yes, name them.

   _____

6.   How would you rate your overall proficiency in using technology for educational   *
   purposes?

   Mark only one oval.

   ⬭ Not pro cient

   ⬭ Somewhat pro cient

   ⬭ Pro cient

   ⬭ Very pro cient

7. Are you aware of what large language models (LLMs) (ChatGPT-3.5, Chat-GPT4,   *
    Google's Bard, Gemini, etc) are?

    Mark only one oval.

    ( ) Yes
    ( ) No

8. Have you ever read about or been taught how LLMs can be used in language   *
    learning?

    Mark only one oval.

    ( ) Yes
    ( ) No
    ( ) Maybe

9. Have you ever used an LLM for any purpose?*

    Mark only one oval.

    ( ) Yes
    ( ) No
    ( ) Maybe

10. Do you believe LLMs can be beneficial in learning and improving English writing?*

    Mark only one oval.

    ( ) Yes
    ( ) No

11. Have you ever used an LLM for assistance in English writing?*

    Mark only one oval.

    ◯ Yes

    ◯ No

    ◯ Maybe

12. If you have used an LLM for writing, what types of writing tasks did you use it for?*

    Check all that apply.

    ☐ Essay and paragraph writing

    ☐ Summarising

    ☐ Paraphrasing

    ☐ Editing and revising drafts

    ☐ Other: _____

13. In which stage of writing do you use LLMs?*

    Check all that apply.

    ☐ Planning

    ☐ Drafting

    ☐ Revising

    ☐ Editing

14. In which type of writing do you use LLMs?*

    Check all that apply.

    ☐ Personal Writing

    ☐ Creative Writing

    ☐ Technical Writing

    ☐ Academic Writing

15.   What LLMs do you use in developing the writing skill?*

Check all that apply.

☐ ChatGPT 3.5
☐ ChatGPT 4
☐ Google's Bard
☐ Gemini

☐ Other: _____

16.   How often do you use LLMs for help with English writing?*

Mark only one oval.

◯ Never

◯ Rarely

◯ Sometimes

◯ Often

◯ Always

17.   What improvements, if any, have you noticed in your writing skills after using   *
        LLMs?

Check all that apply.

☐ Grammar and sentence structure
☐ Vocabulary richness
☐ Clarity and coherence
☐ Spelling
☐ Accuracy

☐ Other: _____

18. How effective do you think LLMs are in improving English writing skills?*

    Mark only one oval.

    ◯ Not effective
    ◯ Slightly effective
    ◯ Moderately effective
    ◯ Very effective

19. Have you faced any challenges while using LLMs for developing the writing skill?*

    Mark only one oval.

    ◯ Yes
    ◯ No

20. What challenges, if any, have you faced when using LLMs?*

    _____

21. Would you prefer traditional learning methods (e.g. using model texts, teacher's* instruction/feedback, dictionary usage, etc.) over LLMs for developing your writing skills?

    Mark only one oval.

    ◯ Yes
    ◯ No

writing?

Mark only one oval.

◯ Very uncomfortable

◯ Somewhat uncomfortable

◯ Neutral

◯ Somewhat comfortable

◯ Very comfortable

23. In your opinion, should LLMs be integrated into regular language learning curricula of writing?   *

Mark only one oval.

◯ Yes

◯ No

◯ Maybe

24. What concerns, if any, do you have about using LLMs in developing the writing skill?   *

Check all that apply.

☐ Accuracy of information
☐ Dependence on technology
☐ Loss of traditional learning methods
☐ Ethical concerns
☐ No concerns

☐ Other: _____

25. Please specify your preferred method of contact (e.g., email, phone). *

Mark only one oval.

( ) Yes

( ) No

27. Please feel free to provide any additional comments or suggestions regarding this research.

_____

_____

_____

_____

_____

Thank You!
Thank you very much for taking the time to complete this questionnaire. We appreciate your honest responses and your willingness to share your experiences and insights. If you have any questions about this study or wish to know more about the results once they are available, please feel free to contact us. abdelhamiddjeghoubbi@gmail.com

Appendix 2: Students' Interview

This semi-structured interview presents a series of targeted questions aimed at understanding students' experiences with using LLMs in their writing development process. It seeks to uncover specific instances where LLMs have influenced their approach to writing, challenges faced, perceived benefits, and areas for improvement. The responses will enrich the study's findings by offering direct insights into the practical application and impact of LLMs from the learners' perspective.

1. Can you share a specific instance where using an LLM significantly impacted your writing process? What was the situation, and how did the LLM assist you?

2. Have you faced any situation where an LLM's suggestion or output was not helpful or misleading? How did you handle that?

3. In your opinion, what are the main advantages of integrating LLMs into the writing learning process?

4. Are there any disadvantages or concerns you have about relying on LLMs for learning and improving your writing skill? Please elaborate.

5. How has your approach to (planning, drafting, revising, and/or editing) your writing changed since you started using LLMs?

6. Can you provide examples of any improvements in the (grammar, vocabulary, spelling, and/or coherence) of your writing since using LLMs?

7. Would you recommend LLMs to other learners for writing assistance? Why or why not?

8. What has been the most important lesson or insight you have gained throughout your journey with using LLMs to develop your writing skill?

9. Is there anything you wish LLMs could do better to assist in the writing process?

Appendix 3: Teachers' Interview

This semi-structured interview gathers insights from teachers on their awareness, use, and perceptions of LLMs for enhancing EFL writing instruction. It delves into teachers' awareness and use of LLMs, integration strategies, pedagogical challenges, and perceptions of LLMs' impact on students' writing proficiency. The questions aim to capture the application of LLMs in teaching, balancing LLMs with traditional methods, and views on the future role of LLMs in language education. Teachers' experiences and viewpoints will enrich the study with perspectives on LLM implementation in EFL writing teaching practices.

Section One: Awareness

1. Where have you first encountered information or discussions about LLMs in the context of language teaching and learning?

Section Two: Use

2. When did you first start using LLMs in your teaching, specifically for developing the writing skill? What motivated this decision?

3. Which LLMs have you used, or are you currently using, in your teaching practice?

4. Can you describe how you integrate LLMs into your writing instruction? Please mention specific examples or activities.

5. How do you balance the use of LLMs with traditional teaching methods in developing the writing skill? Which of the options do you mostly use? Why?

6. In your opinion, which approach to teaching English writing (process, product, and genre) and in which stage of it can be included in LLMs?

7. Have you encountered any pedagogical challenges in integrating LLMs into your teaching? How have you addressed them?

8. Do you use LLMs to facilitate feedback on and assessment of students' written work? How?

9. Based on your experience, how do you see the role of LLMs in teaching the writing skill evolving in the future?

Section Three: Perceptions

10. How do you perceive the potential impact of LLMs on students' writing proficiency and learning outcomes? Which aspect/aspects of writing grammar, spelling, vocabulary, and/or coherence do they impact the most?

11. Do you believe that LLMs can address any specific challenges or limitations in teaching writing skill? If so, which ones?

12. Do you think that students writing attitudes would change with the incorporation of LLMs into teaching writing?

13. How can we address concerns about plagiarism or over-reliance on LLMs in student writing?

14. Can LLMs offer personalised feedback to students regarding their writing performance? Please explain your viewpoint in detail.

15. Would you be interested in training sessions focused on utilising LLMs for teaching EFL, particularly for developing the writing skill? Why or why not?

Appendix 4: Writing Activities Designed with the Help of LLMs

Activity One: Mastering Academic Writing

Objective: By the end of this activity, students will be able to turn non-academic content academic.

Material: Handouts:

Paragraph 1: Through this paper, I tried to explain that using a mix of methods to study language helps us see how it works beyond just sentences, taking into account the surrounding circumstances. By looking at how language connects with its setting, we can come up with good solutions for problems in some areas where language is important.

Paragraph 2: Assessing the writing skill is very important in both school and work, and it's a topic that many people are interested in. Generally, the way we measure the writing skill, which is a key part of teaching a language, can sometimes seem random. I think that this might happen because, unfortunately, teachers don't always have a strong background in how to assess writing, might not be properly trained in evaluating it, or could be limited by the situation they're in.

Instructions:

1. The students begin by reading the provided non-academic paragraphs, which were originally taken from academic papers and then rewritten into a non-academic style with the assistance of language models.

2. The students have to revise these paragraphs, turning them back into academic-style writing. Focus on:

   ● Employing formal language and tone.

   ● Structuring arguments logically.

   ● Integrating evidence and citations where appropriate.

3. After revising the paragraphs, the students will receive the original academic versions, which they will use to compare their revisions to the originals:

   ● The students note any differences in language, structure, and presentation of information.

   ● The students reflect on the choices you made and identify areas for improvement.

Activity Two: Punctuating and Capitalising are Easy

Objective: By the end of this activity, students will be able to properly punctuate and capitalise their written work.

Material: Handouts:

"oppenheimer christopher nolans staggering film about j robert oppenheimer the man known as the father of the atomic bomb condenses a titanic shift in consciousness into three haunted hours a drama about genius hubris and error both individual and collective it brilliantly charts the turbulent life of the american theoretical physicist who helped research and develop the two atomic bombs that were dropped on hiroshima and nagasaki during world war ii cataclysms that helped usher in our human dominated age"

Instructions:

1. The students start by reading the provided synopsis of the film "Oppenheimer," which has been sourced from IMDb but altered by removing all punctuation and capitalization with LLMs.

2. Using what they have learned, the students insert the appropriate punctuation marks and capitalise words where necessary.

3. After they have made their corrections, the teacher will distribute the original paragraph. Students compare their corrected version with the original to assess their punctuation and capitalisation skills.

Activity Three: Crafting an Argumentative Paragraph

Objective: By the end of this activity, students will be able to turn their ideas into paragraphs.

Material: Handouts:

Topic sentence idea: Manga deserves recognition as a legitimate form of literature.
1st supporting sentence idea: Manga features intricate plotlines and deep character development.
2nd supporting sentence idea: The unique visual style of manga enhances storytelling in ways that traditional texts cannot.
3rd supporting sentence idea: Manga addresses a wide range of universal themes.

Instructions:

1. The students Begin by reviewing the topic sentence's and the supporting sentences' ideas, which were generated with LLMs, on their handout.

2. Using the topic and supporting sentences as a foundation, the students write a well-structured argumentative paragraph.

3. The students start with the topic sentence, follow with each supporting sentence, use transitional words or phrases to connect ideas smoothly, and conclude with a sentence that reinforces the argument presented in the topic sentence.

4. The students exchange paragraphs with each other in order to provide and receive feedback on each other's arguments' clarity and persuasiveness.

5. The students revise their paragraphs based on the feedback and reflect on how effectively they have argued in their paragraphs.

مستخلص الدراسة

تستكشف هذه الدراسة الوعي، الاستخدام، والتصورات حول النموذجات اللغوية الكبيرة بين معلمي ومتعلمي اللغة الإنجليزية كلغة أجنبية في الجامعات الجزائرية، مع التركيز على دورها في تطوير مهارة الكتابة. نظرًا لأهمية الذكاء الاصطناعي في تعلم اللغات، تعالج هذا البحث الفجوة في الفهم حول كيفية دمج هذه الأدوات في التدريس والتعلم الجزائري للغة الإنجليزية كلغة أجنبية. من خلال تصميم مختلط متتابع، تدمج البحث البيانات الكَمِّيَّة من 87 استبيانًا مغلق النهاية مع الرؤى النوعية من 9 مقابلات نصف مهيكلة للطلاب و5 للمعلمين. يتيح هذا النهج استكشافًا عميقًا لكل من الأنماط الإحصائية والتجارب الشخصية بخصوص استخدام النموذجات اللغوية الكبيرة في تطوير مهارة الكتابة. تشير النتائج إلى مستوى عال من الانخراط باستخدام النموذجات اللغوية الكبيرة، حيث يعترف معظم الطلاب والمعلمين بإمكاناتها الكبيرة في تحسين مهارة الكتابة بشكل ملحوظ. ومن الواضح أن الطلاب أفادوا بتحسينات في القواعد والمفردات، في حين شدد المعلمون على فائدة النموذجات اللغوية الكبيرة في تقديم التغذية الراجعة وتفاعل المتعلمين. ومع ذلك، تم ذكر قضايا مثل الاعتماد على التِقَائَة والمخاوف بشأن النزاهة الأكاديمية أيضًا. مع أنّ النموذجات اللغوية الكبيرة تحمل إمكانات هائلة لتغيير التعليم باللغة الإنجليزية كلغة أجنبية من خلال دعم تطوير مهارة الكتابة، الا ان هناك حاجة ملحة لإرشادات تتعلق بالاستخدام الفعال لتحقيق الفوائد القصوى وتقليل المخاطر. في نهاية المطاف، توصي هذه الدراسة بإنشاء برامج تدريبية للمعلمين وإنشاء معايير لدمج هذه الأدوات في المناهج الدراسية للكتابة.

الكلمات المفتاحية: النموذجات اللغوية الكبيرة، تطوير مهارة الكتابة، جامعة قاصدي مرباح، الذكاء الاصطناعي، اللغة الإنجليزية كلغة أجنبية.

Résumé

Cette étude explore la conscience, l'utilisation et les perceptions des LLMs parmi les enseignants et les apprenants universitaires algériens en EFL, en mettant l'accent sur leur rôle dans le développement de la compétence rédactionnelle. Étant donné l'importance de l'intelligence artificielle dans l'apprentissage des langues, cette recherche aborde un vide en matière de compréhension de l'intégration de tels outils dans l'enseignement et l'apprentissage de l'EFL en Algérie. Avec un design méthodologique mixte séquentiel, la recherche intègre des données quantitatives provenant de 87 questionnaires à choix multiples complétés avec des aperçus qualitatifs issus de 9 entretiens semi-structurés d'étudiants et 5 d'enseignants. Cette approche permet une exploration approfondie des motifs statistiques et des expériences personnelles concernant l'utilisation des LLMs dans le développement de la compétence rédactionnelle. Les résultats indiquent un haut niveau d'engagement avec les LLMs, la majorité des étudiants et des enseignants reconnaissant leur potentiel à améliorer significativement la compétence rédactionnelle. Manifestement, les étudiants ont rapporté des améliorations en grammaire et en vocabulaire, tandis que les enseignants ont souligné l'utilité des LLMs dans la fourniture de retours et l'engagement des apprenants. Néanmoins, des problèmes tels que la dépendance à la technologie et les préoccupations concernant l'intégrité académique ont également été mentionnés. Bien que les LLMs offrent un potentiel remarquable pour transformer l'éducation en EFL en soutenant le développement de la compétence rédactionnelle, il est urgent de mettre en place des directives sur leur utilisation efficace afin de maximiser les bénéfices et de minimiser les risques. Enfin, cette étude recommande la création de programmes de formation pour les enseignants et l'établissement de normes pour l'intégration de tels outils dans les curriculums d'écriture.

Mots-clés: Modèles de langage de grande taille, Développement de la compétence rédactionnelle, Université Kasdi Merbah, Intelligence artificielle, Anglais comme langue étrangère.